

低功率射頻器材技術規範測試報告

報告編號	RTBAYS-WTW-P20110319-1
申請者	捷佳科技股份有限公司
產品名稱	11ac 2T2R WIFI & BT Module
型號	WMU6202, WMU6206
系列型號	WMU6203, WMU6204, WMU6205, WMU6207
製造廠商	捷佳科技股份有限公司
商標或廠牌	jjPlus
該產品樣品試驗 依據之試驗標準	國家通訊傳播委員會低功率射頻器材技術規範 109 年 7 月 1 日訂定
試驗結果	合格

香港商立德國際商品試驗有限公司桃園分公司 林口實驗室

日期 109 年 12 月 03 日

報告簽署人簽章:



目 錄

報告發行紀錄	4
1 低功率射頻器材量測記錄表	6
2 一般敘述	7
2.1 待測設備	7
2.2 輔助測試之週邊設備描述	10
2.3 測試架構圖	10
3 適用規範	11
3.1 規範要求	11
3.2 限制使用之頻帶	13
4 帶外發射之量測	14
4.1 適用標準	14
4.2 量測方法	14
4.3 量測儀器	15
4.4 測試配置	17
4.5 場強度之計算	18
4.6 量測結果	19
4.6.1 發射諧波	19
4.6.2 接收諧波	43
4.6.3 其它不必要之訊號	47
4.7 帶外發射之量測 (傳導)	51
4.8 量測結果判定	54
4.9 配置照片	54
5 電源線傳導干擾之量測	55
5.1 適用標準	55
5.2 量測方法	55
5.3 量測儀器	55
5.4 測試配置	56
5.5 干擾值之計算	56
5.6 量測結果	57
5.7 量測結果判定	60
5.8 配置照片	60
6 20 dB 頻寬之量測	61
6.1 適用標準	61
6.2 量測方法	61
6.3 量測儀器	61
6.4 測試配置	61
6.5 量測結果	62
6.6 量測結果判定	62
7 峰值傳導輸出功率之量測	63
7.1 適用標準	63
7.2 量測方法	63
7.3 量測儀器	63
7.4 測試配置	63
7.5 量測結果	64
7.6 量測結果判定	64

8	跳頻頻道數之量測	65
8.1	適用標準	65
8.2	量測方法	65
8.3	量測儀器	65
8.4	測試配置	65
8.5	量測結果	66
8.6	量測結果判定	66
9	跳頻頻道間隔之量測	67
9.1	適用標準	67
9.2	量測方法	67
9.3	量測儀器	67
9.4	測試配置	67
9.5	量測結果	68
9.6	量測結果判定	68
10	每一頻道停留時間之量測	69
10.1	適用標準	69
10.2	量測方法	69
10.3	量測儀器	69
10.4	測試配置	69
10.5	量測結果	70
10.6	量測結果判定	71
11	檢測實驗室基本資料	72

報告發行紀錄

Issue No.	Description	Date Issued
RTBAYS-WTW-P20110319-1	Original release	109 年 12 月 03 日

證 明 書

發行日期：109 年 12 月 03 日

產 品 名 稱：11ac 2T2R WIFI & BT Module
商 標：jjPlus
型 號：WMU6202, WMU6206
系 列 型 號：WMU6203, WMU6204, WMU6205, WMU6207
申 請 者：捷佳科技股份有限公司
量 測 規 範：低功率射頻器材技術規範 LP0002 (訂定日期：109 年 7 月 1 日)
ANSI C63.10-2013

香港商立德國際商品試驗有限公司桃園分公司在此證明上述待測設備樣品一組(型號：WMU6202, WMU6206)，收件日期 107 年 11 月 27 日，於 108 年 01 月 15 日至 109 年 11 月 27 日，已在本公司的標準測試場地完成量測。報告中所描述之測試結果和待測設備的架構組合，均根據樣品實際的量測情況作詳實的記錄。

立德桃園分公司依“低功率射頻器材技術規範”及“電信管制射頻器材審驗管理辦法”製作測試結果報告。

特 此 證 明 ！

報告製作者：

簡佳琪

簡佳琪 / 專員

， 日 期：

109 年 12 月 03 日

審 核 者：

陳志偉

陳志偉 / 高級專案工程師

， 日 期：

109 年 12 月 03 日

香港商立德國際商品試驗有限公司桃園分公司

實驗室地址：新北市林口區嘉寶里 14 鄰 47-2 號

此份報告不得摘錄複製，除全份複製外，需經實驗室書面同意。



1 低功率射頻器材量測記錄表

申請廠商：捷佳科技股份有限公司

製造廠商：捷佳科技股份有限公司

申請廠商地址：新北市中和區建八路 2 號 15 樓之 7

廠牌：jjPlus

產品名稱：11ac 2T2R WIFI & BT Module

型號：WMU6202, WMU6206

系列型號：WMU6203, WMU6204, WMU6205, WMU6207

量測單位名稱：香港商立德國際商品試驗有限公司桃園分公司

林口實驗室華亞檢測部

量測單位地址：桃園市龜山區文化里華亞二路 19 號

量測單位認可編號：TAF 2021 (9kHz~40GHz)

量測規範：低功率射頻器材技術規範 LP0002 (訂定日期：109 年 7 月 1 日)

ANSI C63.10-2013

Bluetooth 頻段概要

項次	量測項目	規 範	量測結果判定
1	帶外發射	低功率射頻器材技術規範 4.10.1.5	合格
2	電源線傳導干擾	低功率射頻器材技術規範 3.3 節	合格
3	20 dB 頻寬	低功率射頻器材技術規範 4.10.1.6 節	Note 1
4	峰值傳導輸出功率	低功率射頻器材技術規範 4.10.1.2 節	合格
5	跳頻頻道數之量測	低功率射頻器材技術規範 4.10.1.6 節	合格
6	跳頻頻道間隔之量測	低功率射頻器材技術規範 4.10.1.6 節	合格
7	每一頻道停留時間之量測	低功率射頻器材技術規範 4.10.1.6 節	合格

Note:

1. 此頻寬測試值為跳頻頻道間隔之量測參考值。
2. 量測結果之判定不考慮量測不確定度的貢獻。

2 一般敘述

2.1 待測設備

產品名稱：	11ac 2T2R WIFI & BT Module
型號：	WMU6202, WMU6206
系列型號：	WMU6203, WMU6204, WMU6205, WMU6207
額定電源：	Model: 6202, 6203: 3.3Vdc (power from host equipment) Model: 6204, 6205, 6206, 6207: 5Vdc (power from host equipment)
調變方式：	GFSK, $\pi/4$ -DQPSK, 8DPSK
傳輸速率：	1/ 2/ 3Mbps
載波頻率：	2402 ~ 2480MHz
頻道數：	79
發射功率：	5.77dBm
天線種類：	見註 2
電源線類別：	NA
信號線類別：	NA
配件：	NA

註1： 所有型號與型號差異詳列如下。

Test Mode	Model	RF Chip	RF Design	Interface	Antenna type	Antenna connector
v	WMU6202	RTL8822BU	The Same	mPCIe	Dipole	U.FLx2
	WMU6203			M.2		MHF4
	WMU6204			USB Type-A		U.FLx2
	WMU6205			4Pin Wafer		U.FLx2
v	WMU6206			USB Type-A	PCB Antenna	none (like solder)
	WMU6207			4Pin Wafer	x2	none (like solder)

*The difference Models are pre-tested, because the connector and interface are difference with difference Model, and selected the worst Model for testing.

*Model WMU6202, WMU6203, WMU6204 and WMU6205 the difference doesn't affect the test result, only WMU6202 was chosen for the final test.

*Model WMU6206 and WMU6207 the difference doesn't affect the test result, only WMU6206 was chosen for the final test.

註2： 此待測設備搭配測試的天線，其資料如下：

Antenna Type	Brand	Model	Antenna Gain (dBi)		
			BT	2.4G	5G
Dipole	LYNwave	AOA160-221020-000000	3.0	3.0	2.0
	LYNwave	AOA160-221034-000000	3.0	3.0	3.0
	LYNwave	AOA160-221050-000000	5.0	5.0	5.0
PCB	N/A	N/A	3.6	3.6	5.3
	N/A	N/A	3.6	3.6	4.7

*上述天線的規格資訊由申請者聲明，實驗室不承擔任何責任。

註3：此報告中，經過評估後以下列測試模式進行最終量測。

量測項目		發射	接收
場強輻射量測	1GHz 以上量測	GFSK: Ch 0, 39, 78 8DPSK : Ch 0, 39, 78	8DPSK : Ch 78 GFSK: Ch 0
	其它不必要之訊號	8DPSK : Ch 78 GFSK: Ch 0	
電源線傳導干擾		8DPSK : Ch 78 GFSK: Ch 0	

*場強輻射量測和電源線傳導干擾量測，經過預測以 GFSK, $\pi/4$ -DQPSK, 8DPSK modulation type and found 8DPSK for測試模式A / GFSK for測試模式 B were the worse, therefore chosen for the final test and presented in the test report.

註4：其測試模式如下。

測試模式	測試狀態
A	Model: WMU6202
B	Model: WMU6206

*電源線傳導干擾量測和場強輻射量測進行上述兩種測試模式，但其它測試項目以測試模式 A 具有較大干擾雜訊，因此僅此模式記錄在報告中。

註5： The BT could transmit simultaneously either with WLAN 2.4GHz or 5GHz at the same time.

註6： 待測設備經評估三個正交軸方位評估測試擺設方式：平躺、側放、垂直，其中測試模式A以垂直擺放擁有最大干擾值，測試模式B以平躺擺放擁有最大干擾值，故以上述擺設方式進行最終量測並記錄於報告中。

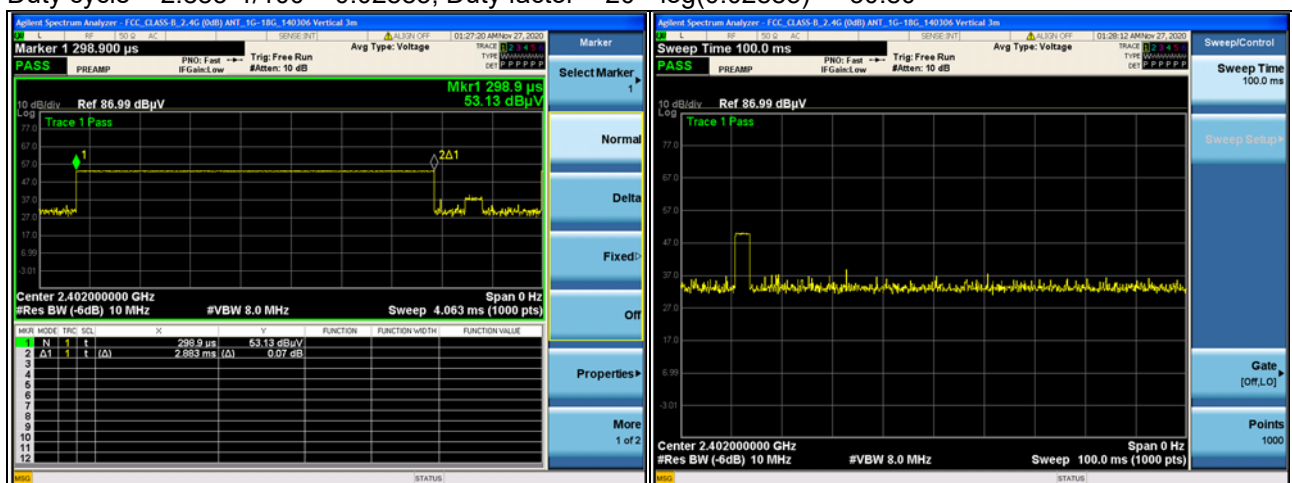
註7： 此報告中Bluetooth EDR傳輸模式，各測試項目皆以GFSK調變和8DPSK調變分別進行測試；場強輻射之量測1G以下及電源線傳導干擾，以GFSK調變技術具有較大干擾值，故以此進行最終量測並記錄於報告中。

註8： Bluetooth EDR傳輸模式DH1、DH3及DH5皆經過預測試，其中以DH5的傳輸模式具有較大干擾雜訊，故僅以此傳輸模式進行最終量測。

註9： Duty cycle of test signal.

GFSK

Duty cycle = $2.883 \times 1/100 = 0.02883$, Duty factor = $20 * \log(0.02883) = -30.80$



8DPSK

Duty cycle = $2.887 \times 1/100 = 0.02887$, Duty factor = $20 * \log(0.02887) = -30.78$



此裝置各頻道的中心頻率如下：

Bluetooth EDR 頻段：

頻道	對應頻率 (MHz)	頻道	對應頻率 (MHz)	頻道	對應頻率 (MHz)	頻道	對應頻率 (MHz)	頻道	對應頻率 (MHz)	頻道	對應頻率 (MHz)
0	2402	14	2416	28	2430	42	2444	56	2458	70	2472
1	2403	15	2417	29	2431	43	2445	57	2459	71	2473
2	2404	16	2418	30	2432	44	2446	58	2460	72	2474
3	2405	17	2419	31	2433	45	2447	59	2461	73	2475
4	2406	18	2420	32	2434	46	2448	60	2462	74	2476
5	2407	19	2421	33	2435	47	2449	61	2463	75	2477
6	2408	20	2422	34	2436	48	2450	62	2464	76	2478
7	2409	21	2423	35	2437	49	2451	63	2465	77	2479
8	2410	22	2424	36	2438	50	2452	64	2466	78	2480
9	2411	23	2425	37	2439	51	2453	65	2467		
10	2412	24	2426	38	2440	52	2454	66	2468		
11	2413	25	2427	39	2441	53	2455	67	2469		
12	2414	26	2428	40	2442	54	2456	68	2470		
13	2415	27	2429	41	2443	55	2457	69	2471		

詳細之規格請參考使用說明書，產品的照片請參照BV報告編號: BAYS-WTW-P20110319。

2.2 輔助測試之週邊設備描述

待測設備於受測時均接上其所屬的配件或一般用途之相關設備；下列輔助設備或配件測試中所使用的配備，以形成一個代表待測物實際運作的受測系統。

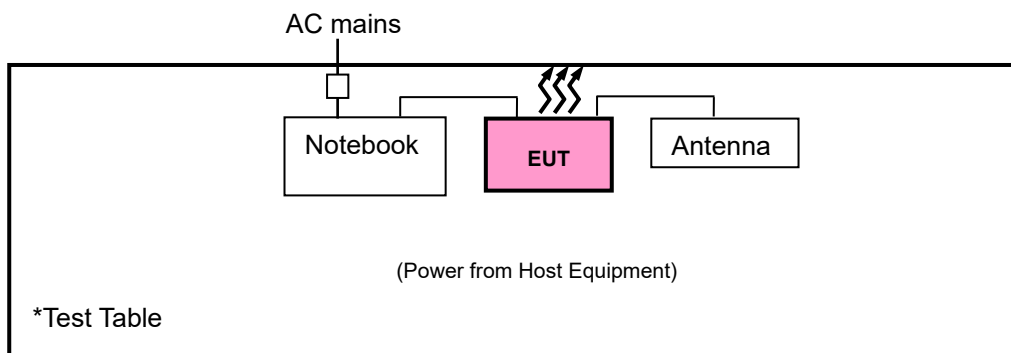
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E6420	D3T96R1	FCC DoC Approved	-

Note:

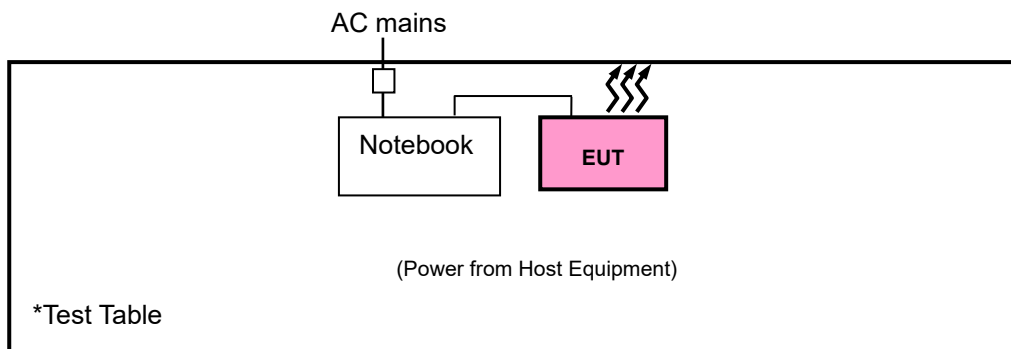
1. All power cords of the above support units are non-shielded (1.8m).
2. 本案器材申請者切結不提供隨貨配件，配件由實驗室提供併同檢測。

2.3 測試架構圖

測試模式 A



測試模式 B



3 適用規範

3.1 規範要求和參考

(1) 傳導之規定

依據國家通訊傳播委員會低功率射頻器材技術規範之 3.3 節，電源傳導干擾之限制要求如下：

頻率 (MHz)	傳導限制值 (dBuV)	
	準峰值(Quasi-peak)	平均值(Average)
0.15-0.5	66-56(註)	56-46(註)
0.5-5	56	46
5-30	60	50

(註)：隨頻率之對數遞減。

(2) 帶外發射之規定

依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.5 節之要求，操作頻帶範圍外之任意 100 kHz 內，發射機所產生的射頻功率相較於使用頻帶範圍中包含最高所需功率之 100 kHz 內的射頻功率，其衰減值限制如下：(1) 輸出功率以附件二之峰值輸出功率方式測量者，至少須衰減 20 dB，可使用射頻傳導或輻射方式測量。(2) 輸出功率以 4.10.1.2(1)(C)之最大傳導輸出功率測量方式者，至少須衰減 30 dB。此外，落於 3.5 禁用頻段之輻射發射，應符合 3.6 之規定。

頻率(MHz)	電場強度(微伏特/公尺, uV/m)	測距(公尺)
$0.009 \leq f \leq 0.490$	$2,400/f(\text{kHz})$	300
$0.490 < f \leq 1.705$	$24,000/f(\text{kHz})$	30
$1.705 < f < 30$	30	30
$30 \leq f \leq 88$	100	3
$88 < f \leq 216$	150	3
$216 < f \leq 960$	200	3
$960 < f$	500	3

(3) 天線之規定

天線規格不受第 3.2 節規定之限制。

(4) 天線增益之要求

低功率發射機，依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.3 節之規定如下：

- (A) 進行固定式點對點操作時，其發射天線之方向性增益超過 6 dBi，每超過 3 dBi，最大傳導輸出功率限制值應降低 1 dB。
 - (B) 天線以多向波束發射方式(含同時發射或循序發射)將訊號導向多個接收機或接收機群組時，應符合下列規定：
 - (a) 非同時發射多向波束者，所有載波或頻道傳輸至所有天線陣列或陣列群之總和傳導輸出功率應符合 4.10.1.2 之功率限制值。如天線/天線陣列群之方向性增益超過 6 dBi，每超過 3 dBi，總和傳導輸出功率限制值應降低 1 dB。方向性增益值應計算如下：
 - (i) 方向性增益值 = $10\log(\text{天線陣列之單元數目}) + \text{各單元中最高之方向性增益值}$ 。
 - (ii) 天線陣列間之遮蔽效應或波束干涉損失能充分佐證時，方向性增益得低於(i)計算數值。
 - (b) 同時發射多向波束於相同或不同頻道者，其每一波束功率應符合(a)之功率限制值。如發射波束有重疊現象，功率應降低，以確保總和傳導輸出功率符合(a)之限制值。同時發射的所有波束總和傳導輸出功率不大於(a)總和傳導輸出功率限制值加 8 dB。方向性增益值計算同(a)。
 - (c) 發射機之天線具備單向波束功能者，應符合(1)(A)及(3)後段之規定。
- 除(A)及(B)外，使用超過 6 dBi 方向增益之發射天線時，應依超過 6 dBi 天線方向增益的 dBi 總量，等量減少最大傳導輸出功率限制值。

(5) 峰值傳導輸出功率之要求

依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.2 節之規定：
操作於 2400 MHz~2483.5 MHz 者

- (a) 至少使用 75 個跳頻頻道之跳頻系統：1 W(含)以下。
- (b) 除(a)外，依 4.10.1.6 (1)(A)(a)之跳頻系統：0.125 W(含)以下。
- (c) 數位調變技術系統：1 W(含) 以下。

除使用附件二之峰值輸出功率測量方式外，並得使用以最大傳導輸出功率(Maximum Conducted Output Power)作為測量方式。

(6)跳頻頻道數之量測

依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.6 節之規定，操作於 2400-2483.5 MHz 之展頻跳頻系統，須使用至少 15 個無重疊的頻道。應使用智慧型跳頻技術，以避免占用於特定跳頻頻道。

(7)跳頻頻道間隔之量測

依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.6 節之規定，跳頻系統之載波頻率頻道間隔應大於或等於 25 kHz 或跳頻頻道之 20 dB 頻寬，兩者取較寬者。但操作頻率為 2400 MHz~2483.5 MHz 頻段且輸出功率應小於或等於 125 mW 跳頻系統，其載波頻率頻道間隔不得小於 25 kHz 或跳頻頻道 20 dB 頻寬之三分之二，兩者取較寬者。系統之跳頻頻道應依虛擬亂數排列，在各頻率之跳頻頻道上跳躍。每一發射機必須均等的使用每一頻率。系統接收機應具有與發射機跳躍頻道頻寬相匹配之輸入頻寬，且應隨所發射之訊號同步偏移接收頻率。

(8)每一頻道停留時間之量測

依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.6 節之規定，操作於 2400 MHz~2483.5 MHz 之展頻跳頻系統，須使用至少 15 個無重疊的頻道，在 0.4 秒乘以跳頻頻道數之週期內，任一頻率占用之平均時間應小於或等於 0.4 秒。應使用智慧型跳頻技術，以避免占用於特定跳頻頻道。

(9)電波暴露量之評估

依據國家通訊傳播委員會低功率射頻器材技術規範 6.20.2 節之規定，若受測物於正常操作模式下，其發射機距離人體 20 公分以上者，可測試最大暴露允許值(Maximum Permissible Exposure, MPE)以證明其符合電波暴露量之要求。

限制值如下：

(1) 職業性/可控制之暴露

頻率範圍 (MHz)	電場強度 (V/m)	磁場強度 (A/m)	功率密度 (mW/cm ²)	平均時間 (minutes)
0.3 - 3.0	614	1.63	*100	6
3 - 30	1842/f	4.89/f	*900/f ²	6
30 - 300	61.4	0.163	1.0	6
300 - 1,500	---	---	f/300	6
1,500 - 100,000	---	---	5.0	6

註 1：標記*表平面波等效功率密度。

註 2：f 表測試頻率，單位：MHz。

(2) 一般人/不可控制之暴露

頻率範圍 (MHz)	電場強度 (V/m)	磁場強度 (A/m)	功率密度 (mW/cm ²)	平均時間 (minutes)
0.3 - 3.0	614	1.63	*100	30
3 - 30	1842/f	4.89/f	*180/f ²	30
30 - 300	27.5	0.073	1.0	30
300 - 1,500	---	---	f/1500	30
1,500 - 100,000	---	---	1.0	30

註 1：標記*表平面波等效功率密度。

註 2：f 表測試頻率，單位：MHz。

3.2 限制使用之頻帶

除本規範另有規定外，任何低功率射頻器材之主波皆不得使用下表所列各頻段之頻率；低功率射頻器材落於下表所列頻段之混附發射，其電場強度必須符合 3.6 之限制規定。

頻率(兆赫)	頻率(兆赫)	頻率(兆赫)
0.090~0.110	240.00~285.00	3332.0~3339.0
0.490~0.510	322.00~335.40	3345.8~3358.0
2.172~2.198	399.90~410.00	3500.0~4400.0
3.013~3.033	485.00~510.00	4500.0~5250.0
4.115~4.198	608.00~614.00	5350.0~5460.0
5.670~5.690	703.00~748.00	7250.0~7750.0
6.200~6.300	758.00~803.00	8025.0~8500.0
8.230~8.400	825.00~915.00	9000.0~9200.0
12.265~12.600	930.00~1240.0	9300.0~9500.0
13.340~13.430	1300.0~1427.0	10600~12700
14.965~15.020	1435.0~1626.5	13250~13400
16.700~16.755	1660.0~1785.0	14470~14500
19.965~20.020	1805.0~1880.0	15350~16200
25.500~25.700	1885.0~1900.0	17700~21400
37.475~38.275	1905.0~1985.0	22010~23120
73.500~75.400	2010.0~2025.0	23600~24000
108.00~138.00	2110.0~2170.0	31200~31800
149.90~150.05	2200.0~2300.0	36430~36500
156.70~156.90	2310.0~2390.0	38600 以上
162.01~167.17	2483.5~2900.0	
167.72~173.20	3260.0~3267.0	

4 帶外發射之量測

4.1 適用標準

請見本報告3.1節第2項的規定。

4.2 量測方法

在電波暗室，將待測物置於0.8米高的非金屬桌面，使其操作在工作狀態。接收天線置於3米距離。桌面要360度旋轉，另外接收天線從離地1米至4米升降變化，以找出最大的輻射電場強度，接收天線分別置於水平、垂直極化各執行測試一次。

備註：對於 1GHz 以上場強輻射的測試，待測物則置於1.5米高的非金屬桌面。

發射諧波：

Peak 為 RBW = 1 MHz, VBW = 3 MHz ;

For Fundamental and Harmonic signal:

Average 為 Peak Value+Duty Cycle Correction Factor(-30.78)

Duty Cycle = $(2.887 \times 1) / 100 = 0.02887$, Correction Factor = $20 \log (\text{Duty Cycle}) = 20 \log (0.02887) = -30.78$,
Duty cycle photo refer 本報告 2.1 章節 註 9

For other signal:

Average 為 RBW = 1 MHz, VBW = 3 MHz ; Detector: RMS ; Sweep time: Auto ; Trace count: trace average of at least 100 traces.

接收諧波：

Below 1 GHz

Peak 為 RBW = 120 kHz, VBW = 360 kHz ; Quasi-Peak 為 RBW = 120 kHz, VBW = 120 kHz

Above 1 GHz:

Peak 為 RBW = 1 MHz, VBW = 3 MHz ; Average 為 RBW = 1 MHz, VBW = 3MHz (RMS) ; Detector: RMS ;
Sweep time: Auto ; Trace count: trace average of at least 100 traces.

其它不必要之訊號

Peak 為 RBW = 120 kHz, VBW = 360 kHz ; Quasi-Peak 為 RBW = 120 kHz, VBW = 120 kHz

4.3 量測儀器

測試日期: 108 年 01 月 15 日至 108 年 01 月 18 日

儀器名稱 (廠牌/製造商)	型號	序號	校正日期	下次校正日期
Test Receiver Agilent Technologies	N9038A	MY52260177	Aug. 20, 2018	Aug. 19, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSV40	100980	Apr. 17, 2018	Apr. 16, 2019
HORN Antenna ETS-Lindgren	3117	00143293	Nov. 25, 2018	Nov. 24, 2019
BILOG Antenna SCHWARZBECK	VULB 9168	9168-616	Nov. 27, 2018	Nov. 26, 2019
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Nov. 25, 2018	Nov. 24, 2019
Fixed Attenuator Woken	00801A1GGAM02Y	NA	May 17, 2018	May 16, 2019
Bluetooth Tester	CBT	100980	Jun. 28, 2017	Jun. 27, 2019
Loop Antenna	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
Preamplifier Agilent	310N	187226	Jun. 19, 2018	Jun. 18, 2019
Preamplifier Agilent	83017A	MY39501357	Jun. 19, 2018	Jun. 18, 2019
Preamplifier EMCI	EMC 184045	980116	Oct. 12, 2018	Oct. 11, 2019
Power Meter Anritsu	ML2495A	1012010	Sep. 05, 2018	Sep. 04, 2019
Power Sensor Anritsu	MA2411B	1315050	Sep. 04, 2018	Sep. 03, 2019
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC -SMS-100-SMS-12 0+RFC-SMS-100-S MS-400)	Jun. 19, 2018	Jun. 18, 2019
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC -SMS-100-SMS-24)	Jun. 19, 2018	Jun. 18, 2019
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HsinTien Chamber 1.

3. The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Frequency	Uncertainty
Radiated emissions	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	2.0153 dB
	200MHz ~ 1000MHz	2.0224 dB
	1GHz ~ 18GHz	1.0121 dB
	18GHz ~ 40GHz	1.94 dB

測試日期: 109 年 11 月 26 日~109 年 11 月 27 日

儀器名稱 (廠牌/製造商)	型號	序號	校正日期	下次校正日期
Test Receiver Agilent Technologies	N9038A	MY52260177	Aug. 24, 2020	Aug. 23, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 16, 2020	Apr. 15, 2021
HORN Antenna ETS-Lindgren	3117	00143293	Nov. 22, 2020	Nov. 21, 2021
BILOG Antenna SCHWARZBECK	VULB 9168	9168-616	Nov. 09, 2020	Nov. 08, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Nov. 22, 2020	Nov. 21, 2021
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 14, 2020	Apr. 13, 2021
Preamplifier Agilent	310N	187226	Jun. 17, 2020	Jun. 16, 2021
Preamplifier Agilent	83017A	MY39501357	Jun. 17, 2020	Jun. 16, 2021
Preamplifier EMCI	EMC 184045	980116	Oct. 07, 2020	Oct. 06, 2021
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SM S-100-SMS-120+RFC-S MS-100-SMS-400)	Jun. 17, 2020	Jun. 16, 2021
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SM S-100-SMS-24)	Jun. 17, 2020	Jun. 17, 2021
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

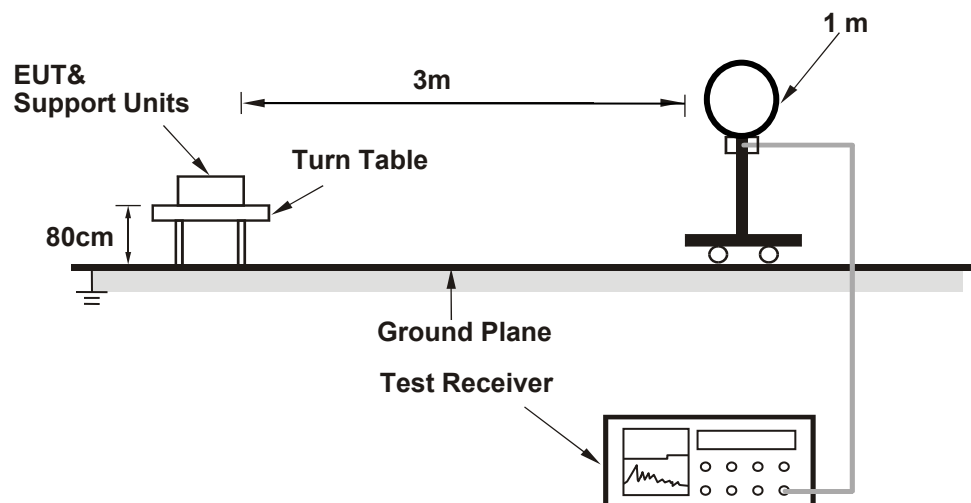
2. The test was performed in HsinTien Chamber 1.

3. The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

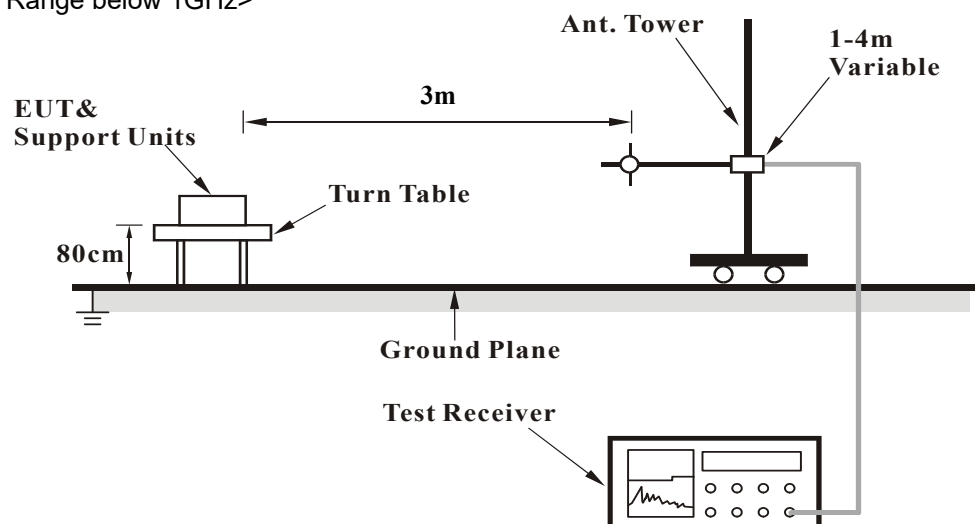
Measurement	Frequency	Uncertainty
Radiated emissions	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	2.0153 dB
	200MHz ~ 1000MHz	2.0224 dB
	1GHz ~ 18GHz	1.0121 dB
	18GHz ~ 40GHz	1.94 dB

4.4 測試配置

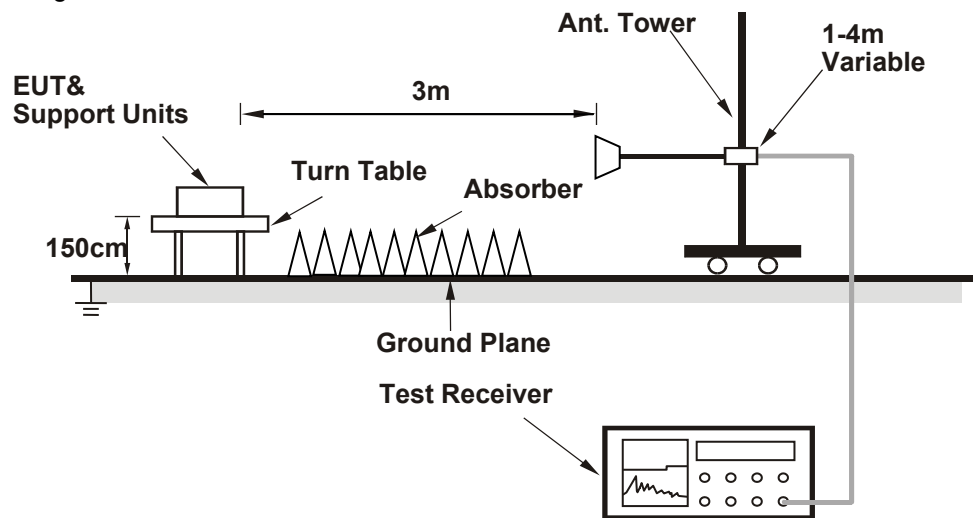
<Frequency Range below 30MHz>



<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



4.5 場強度之計算

場強之計算公式如下：

結果值Emission level (dBuV/m)=機器讀值 Raw Value (dBuV) +校正因子Correction Factor (dB/m)

餘裕度Margin(dB)= 結果值Emission level (dBuV/m)-限制值Limit value (dBuV/m)

量測結果請見下頁。

4.6 量測結果

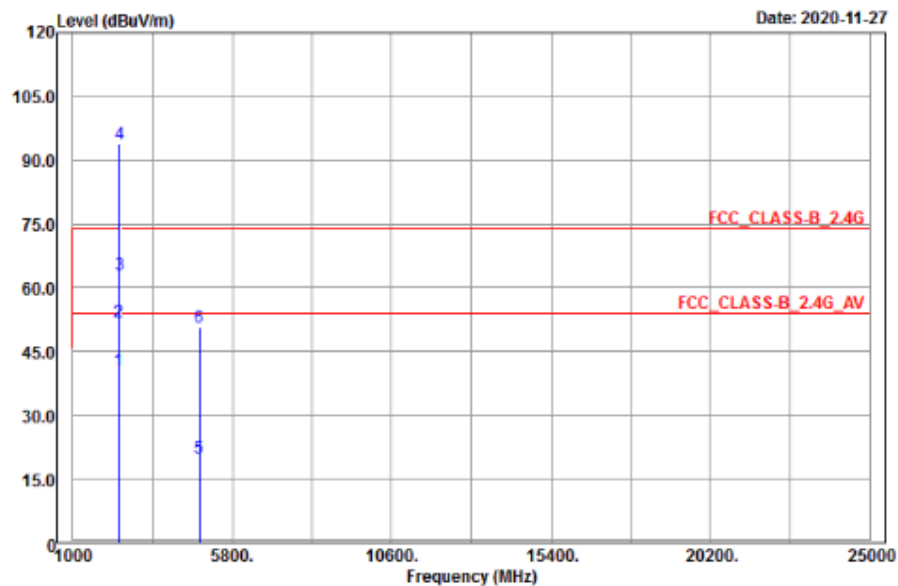
4.6.1 發射諧波

測試模式 A

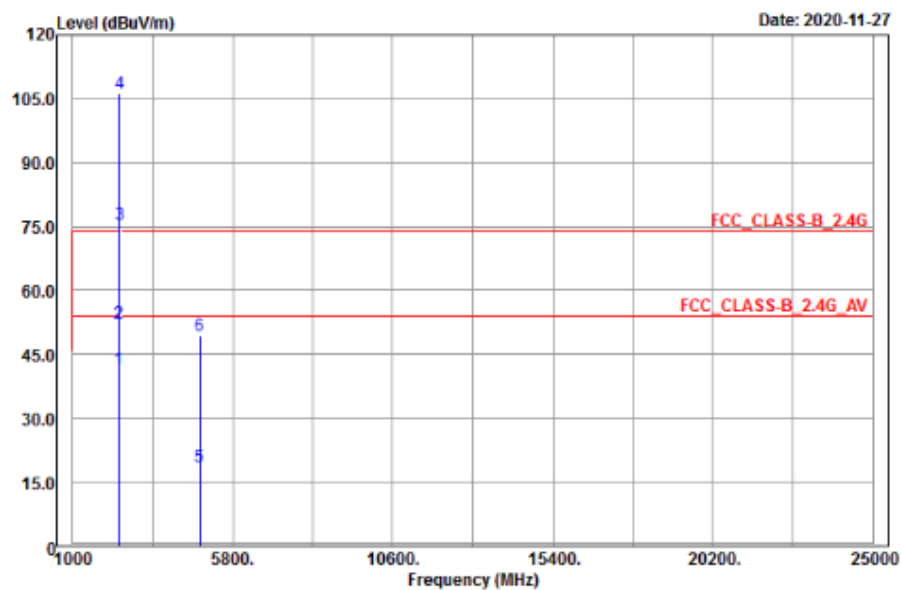
GFSK

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz (System)	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



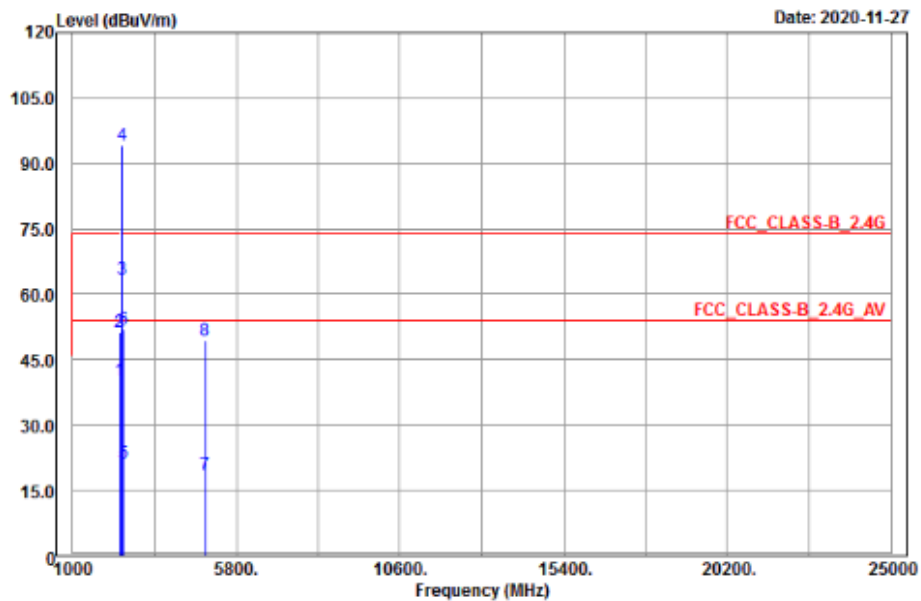
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	40.66	34.44	6.22	54	-13.34	107	0	Average
2390	51.99	45.77	6.22	74	-22.01	107	0	Peak
2402	63	56.76	6.24	-----	-----	107	0	Average
2402	93.8	87.56	6.24	-----	-----	107	0	Peak
4804	20.04	7.79	12.25	54	-33.96	180	122	Average
4804	50.84	38.59	12.25	74	-23.16	180	122	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.61	35.39	6.22	54	-12.39	161	300	Average
2390	52.27	46.05	6.22	74	-21.73	161	300	Peak
2402	75.58	69.34	6.24	-----	-----	161	300	Average
2402	106.38	100.14	6.24	-----	-----	161	300	Peak
4804	18.66	6.41	12.25	54	-35.34	140	166	Average
4804	49.46	37.21	12.25	74	-24.54	140	166	Peak

Remarks:

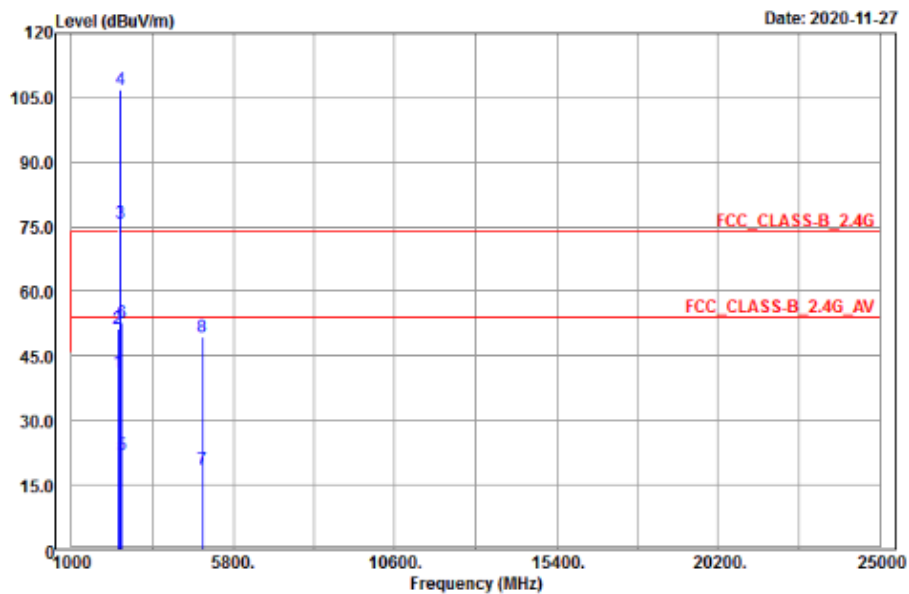
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2402 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz (System)	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



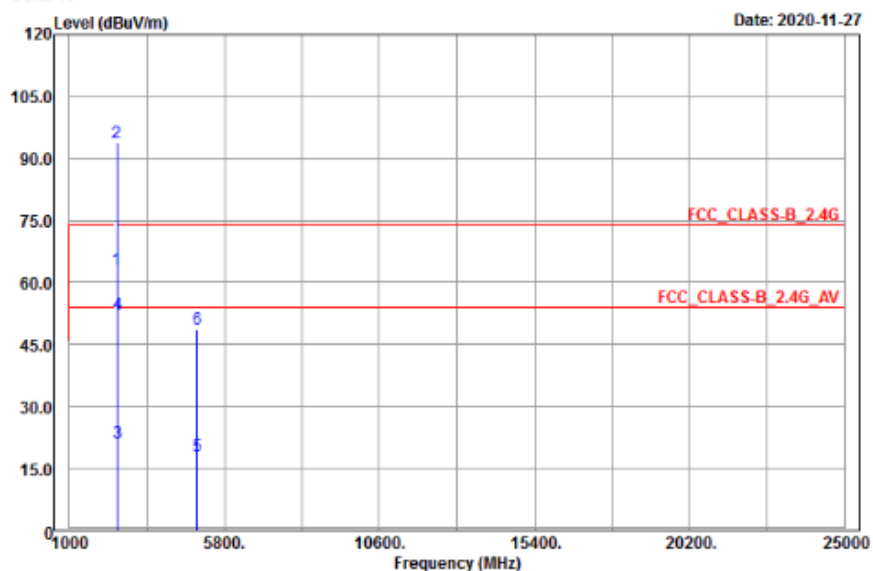
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	40.22	34	6.22	54	-13.78	107	0	Average
2390	51.29	45.07	6.22	74	-22.71	107	0	Peak
2441	63.34	56.94	6.4	-----	-----	107	0	Average
2441	94.14	87.74	6.4	-----	-----	107	0	Peak
2483.5	21.25	14.74	6.51	54	-32.75	107	0	Average
2483.5	52.05	45.54	6.51	74	-21.95	107	0	Peak
4882	18.51	6.08	12.43	54	-35.49	135	211	Average
4882	49.31	36.88	12.43	74	-24.69	135	211	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.29	35.07	6.22	54	-12.71	161	300	Average
2390	51.46	45.24	6.22	74	-22.54	161	300	Peak
2441	75.97	69.57	6.4	-----	-----	161	300	Average
2441	106.77	100.37	6.4	-----	-----	161	300	Peak
2483.5	21.75	15.24	6.51	54	-32.25	161	300	Average
2483.5	52.55	46.04	6.51	74	-21.45	161	300	Peak
4882	18.5	6.07	12.43	54	-35.5	114	230	Average
4882	49.3	36.87	12.43	74	-24.7	114	230	Peak

Remarks:

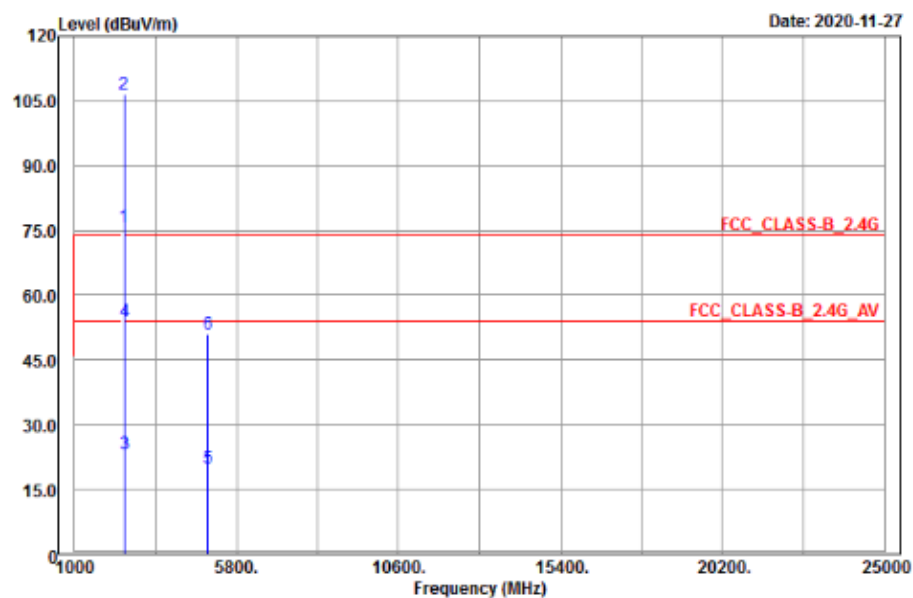
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2441 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 78	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz (System)	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	63.2	56.71	6.49	-----	-----	107	360	Average
2480	94	87.51	6.49	-----	-----	107	360	Peak
2483.5	21.41	14.9	6.51	54	-32.59	107	360	Average
2483.5	52.21	45.7	6.51	74	-21.79	107	360	Peak
4960	17.88	5.34	12.54	54	-36.12	165	131	Average
4960	48.68	36.14	12.54	74	-25.32	165	131	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	75.75	69.26	6.49	-----	-----	161	300	Average
2480	106.55	100.06	6.49	-----	-----	161	300	Peak
2483.5	23.08	16.57	6.51	54	-30.92	161	300	Average
2483.5	53.88	47.37	6.51	74	-20.12	161	300	Peak
4960	20.07	7.53	12.54	54	-33.93	130	125	Average
4960	50.87	38.33	12.54	74	-23.13	130	125	Peak

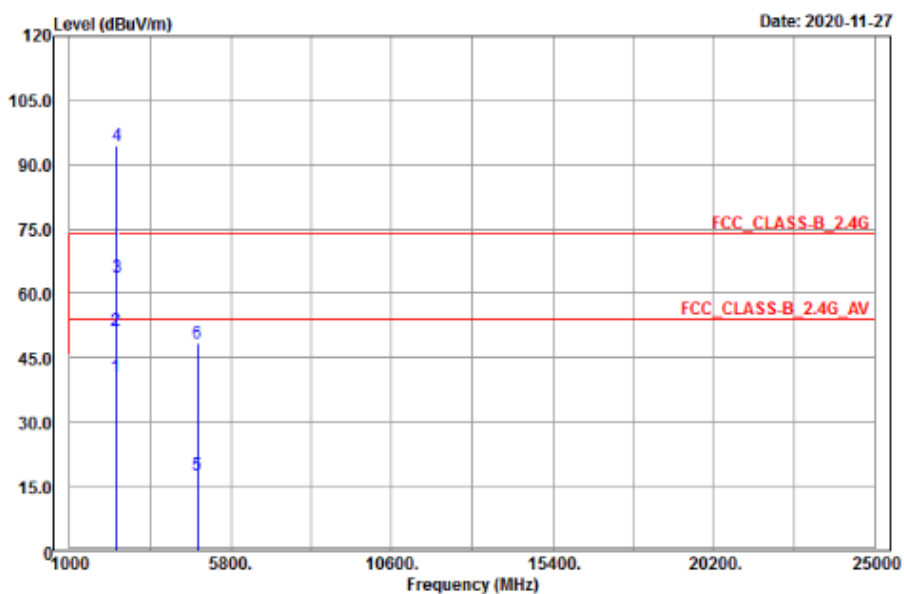
Remarks:

1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2480 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

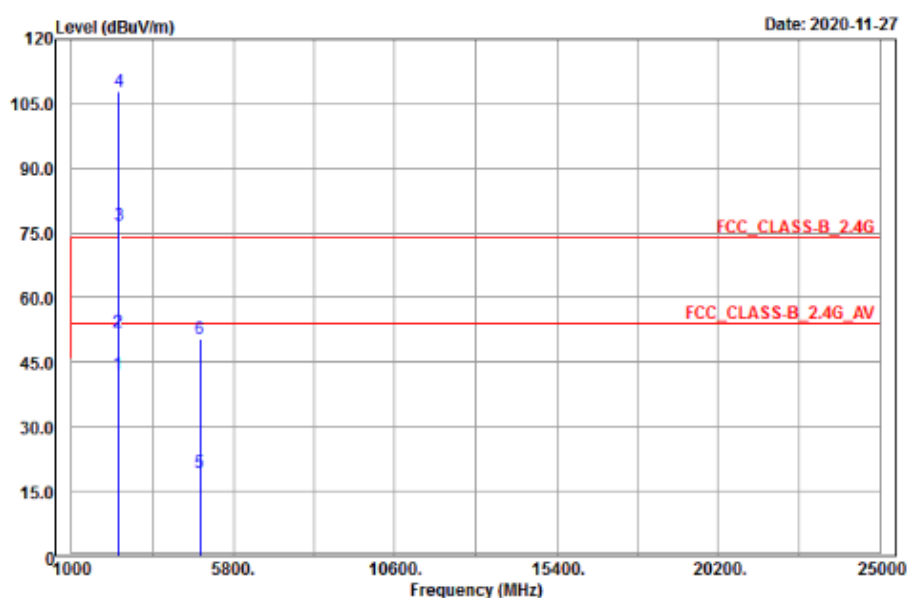
8DPSK

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz (System)	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



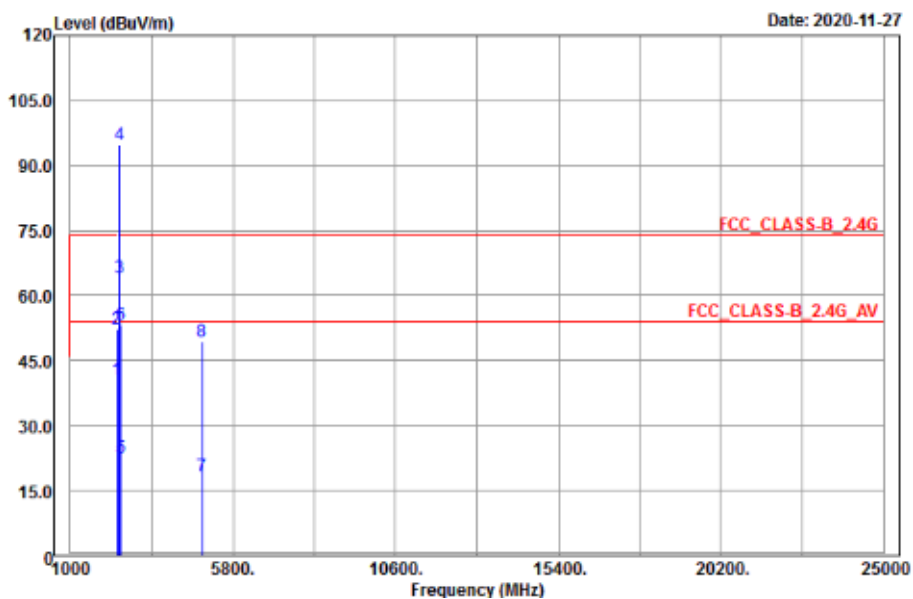
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	40.55	34.33	6.22	54	-13.45	107	360	Average
2390	51.49	45.27	6.22	74	-22.51	107	360	Peak
2402	63.65	57.41	6.24	-----	-----	107	360	Average
2402	94.44	88.2	6.24	-----	-----	107	360	Peak
4804	17.65	5.4	12.25	54	-36.35	125	89	Average
4804	48.44	36.19	12.25	74	-25.56	125	89	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	42.05	35.83	6.22	54	-11.95	161	300	Average
2390	52.11	45.89	6.22	74	-21.89	161	300	Peak
2402	76.95	70.71	6.24	-----	-----	161	300	Average
2402	107.74	101.5	6.24	-----	-----	161	300	Peak
4804	19.43	7.18	12.25	54	-34.57	131	289	Average
4804	50.22	37.97	12.25	74	-23.78	131	289	Peak

Remarks:

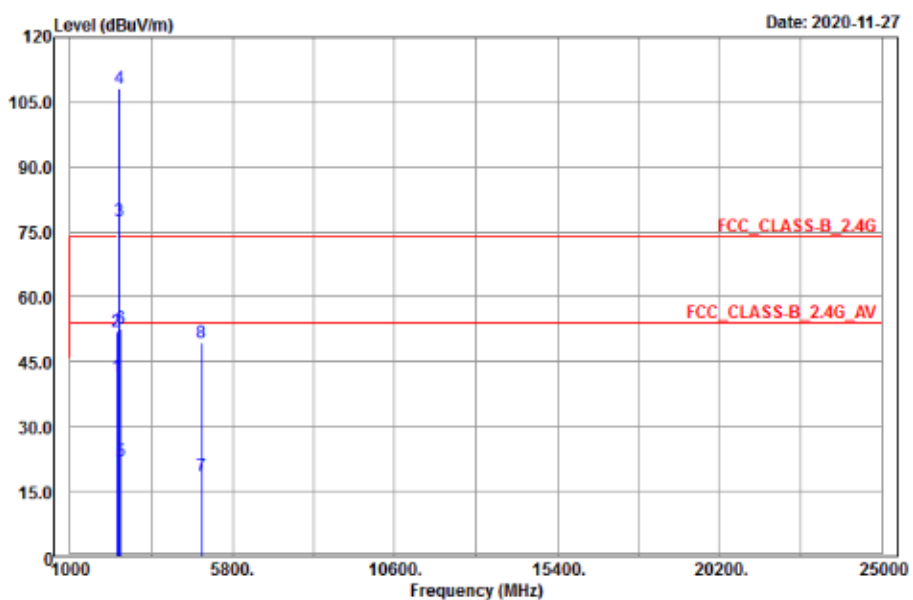
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2402 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz (System)	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



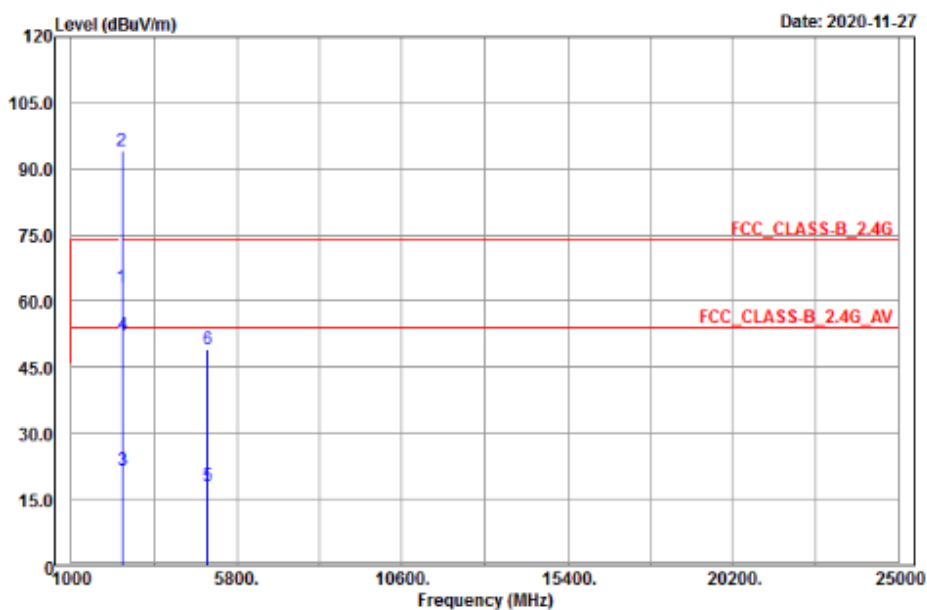
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	40.44	34.22	6.22	54	-13.56	107	360	Average
2390	52.22	46	6.22	74	-21.78	107	360	Peak
2441	64.16	57.76	6.4	-----	-----	107	360	Average
2441	94.95	88.55	6.4	-----	-----	107	360	Peak
2483.5	22.41	15.9	6.51	54	-31.59	107	360	Average
2483.5	53.2	46.69	6.51	74	-20.8	107	360	Peak
4882	18.42	5.99	12.43	54	-35.58	150	66	Average
4882	49.21	36.78	12.43	74	-24.79	150	66	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.58	35.36	6.22	54	-12.42	161	300	Average
2390	52.01	45.79	6.22	74	-21.99	161	300	Peak
2441	77.4	71	6.4	-----	-----	161	300	Average
2441	108.19	101.79	6.4	-----	-----	161	300	Peak
2483.5	21.85	15.34	6.51	54	-32.15	161	300	Average
2483.5	52.64	46.13	6.51	74	-21.36	161	300	Peak
4882	18.5	6.07	12.43	54	-35.5	166	287	Average
4882	49.29	36.86	12.43	74	-24.71	166	287	Peak

Remarks:

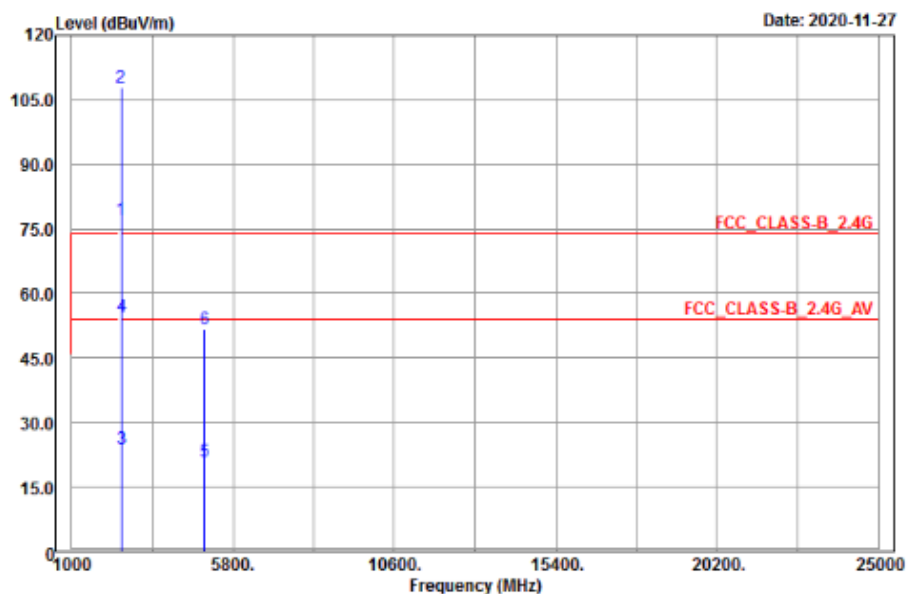
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2441 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 78	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz (System)	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	63.22	56.73	6.49	-----	-----	107	360	Average
2480	94.01	87.52	6.49	-----	-----	107	360	Peak
2483.5	21.47	14.96	6.51	54	-32.53	107	360	Average
2483.5	52.26	45.75	6.51	74	-21.74	107	360	Peak
4960	18.1	5.56	12.54	54	-35.9	134	299	Average
4960	48.89	36.35	12.54	74	-25.11	134	299	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	77.23	70.74	6.49	-----	-----	161	300	Average
2480	108.02	101.53	6.49	-----	-----	161	300	Peak
2483.5	23.81	17.3	6.51	54	-30.19	161	300	Average
2483.5	54.6	48.09	6.51	74	-19.4	161	300	Peak
4960	20.81	8.27	12.54	54	-33.19	102	133	Average
4960	51.6	39.06	12.54	74	-22.4	102	133	Peak

Remarks:

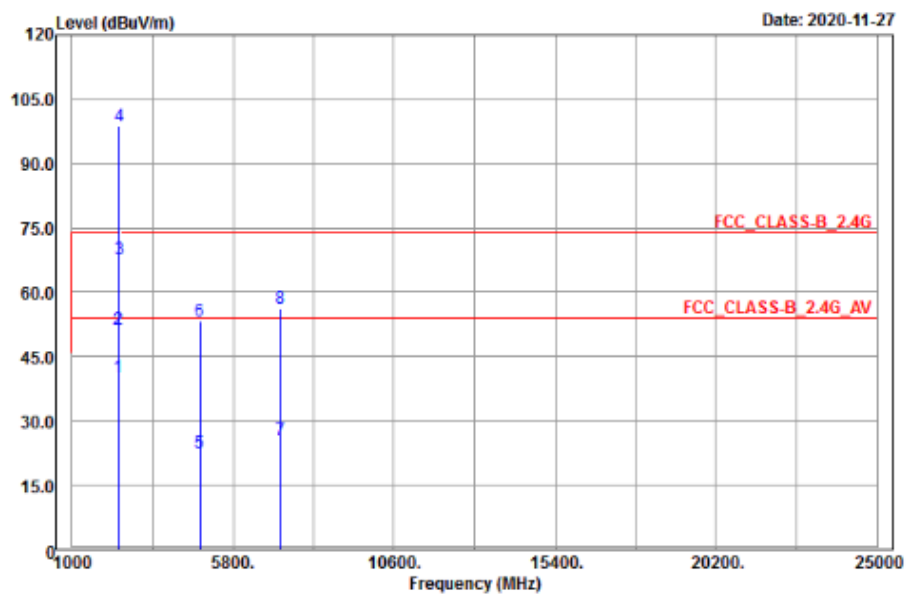
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2480 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

測試模式 B

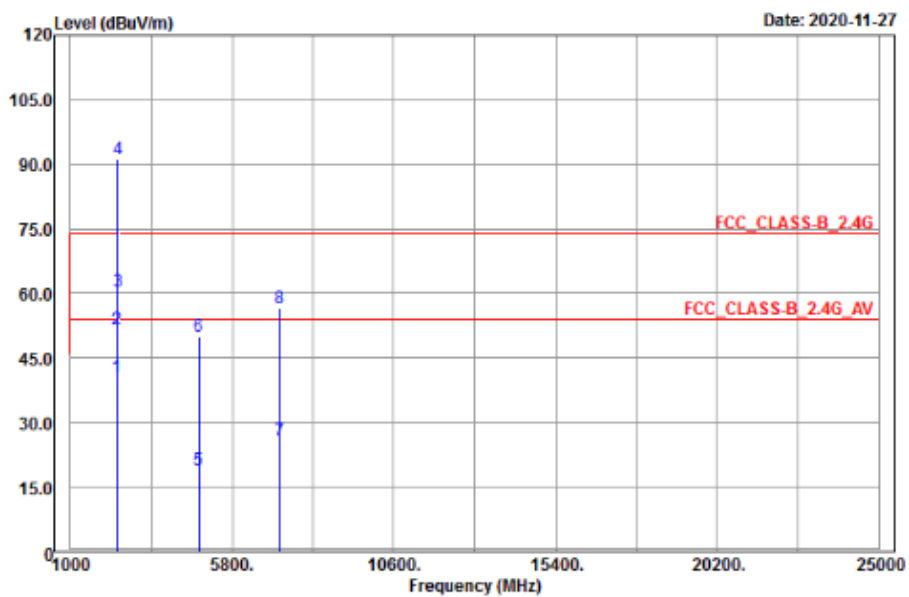
GFSK

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz (System)	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



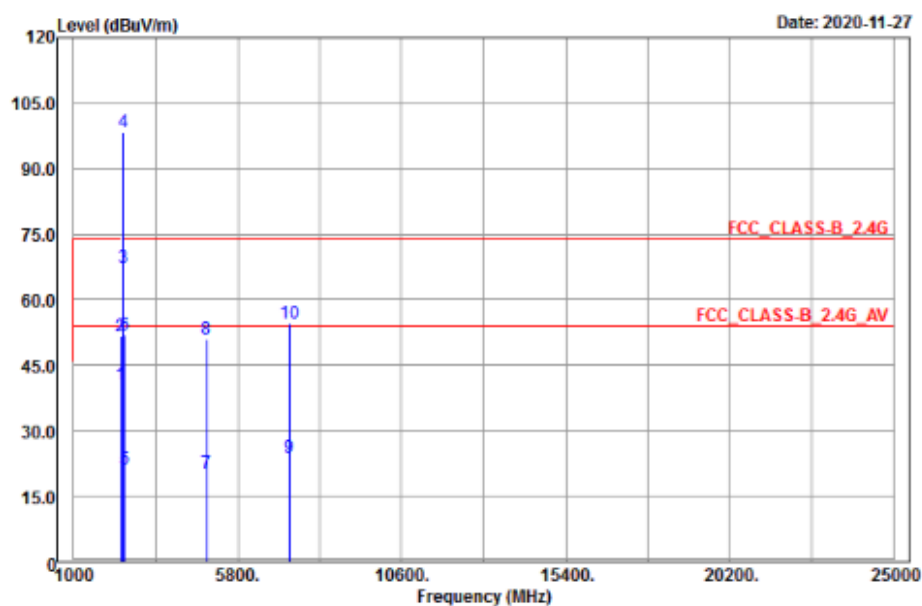
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	40.37	34.15	6.22	54	-13.63	100	204	Average
2390	51.48	45.26	6.22	74	-22.52	100	204	Peak
2402	67.79	61.55	6.24	-----	-----	100	204	Average
2402	98.59	92.35	6.24	-----	-----	100	204	Peak
4804	22.41	10.16	12.25	54	-31.59	102	122	Average
4804	53.21	40.96	12.25	74	-20.79	102	122	Peak
7206	25.58	11.25	14.33	47.79	-22.21	115	202	Average
7206	56.38	42.05	14.33	78.59	-22.21	115	202	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	40.44	34.22	6.22	54	-13.56	100	258	Average
2390	51.68	45.46	6.22	74	-22.32	100	258	Peak
2402	60.48	54.24	6.24	-----	-----	100	258	Average
2402	91.28	85.04	6.24	-----	-----	100	258	Peak
4804	19.08	6.83	12.25	54	-34.92	101	300	Average
4804	49.88	37.63	12.25	74	-24.12	101	300	Peak
7206	25.9	11.57	14.33	40.48	-14.58	103	306	Average
7206	56.7	42.37	14.33	71.28	-14.58	103	306	Peak

Remarks:

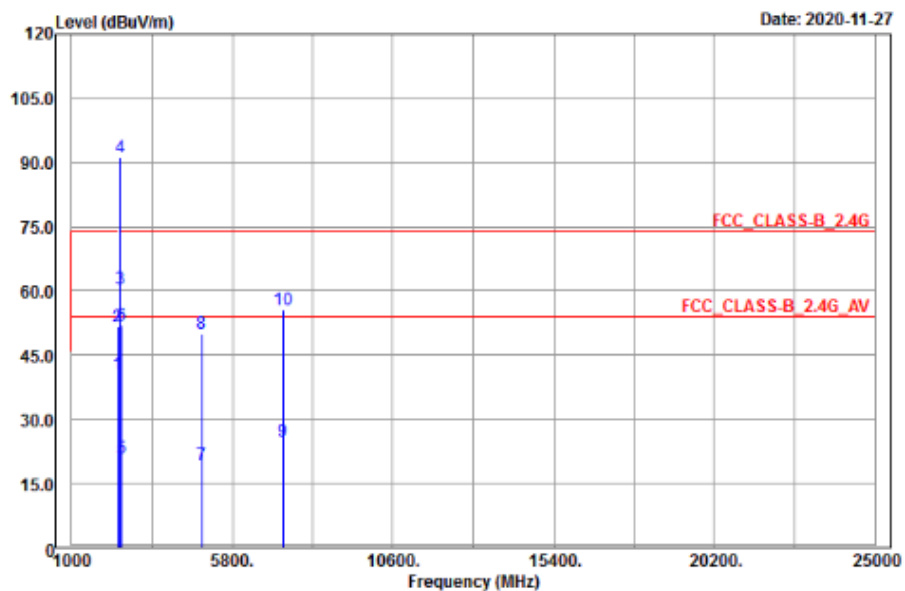
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2402 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz (System)	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



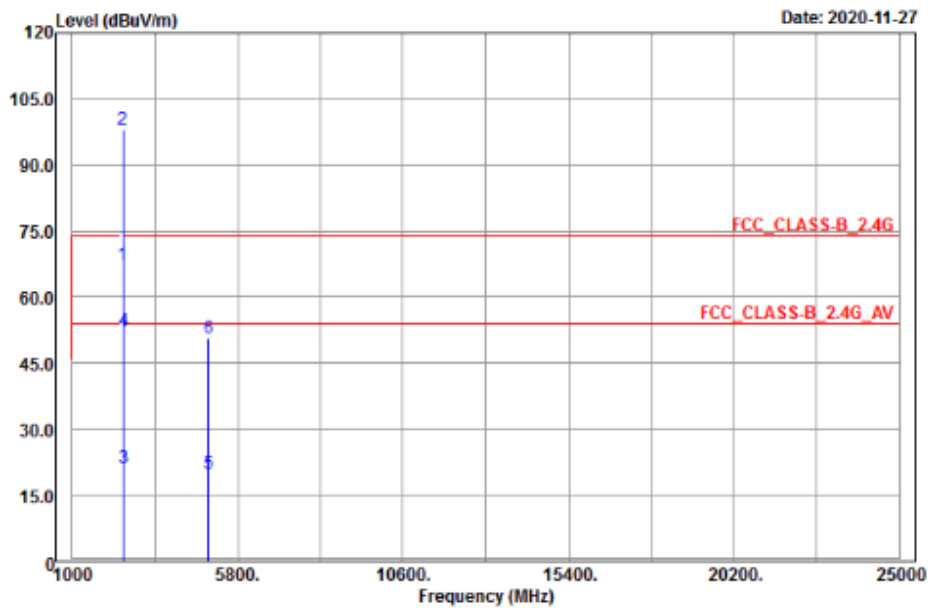
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	40.44	34.22	6.22	54	-13.56	100	204	Average
2390	51.68	45.46	6.22	74	-22.32	100	204	Peak
2441	67.46	61.06	6.4	-----	-----	100	204	Average
2441	98.26	91.86	6.4	-----	-----	100	204	Peak
2483.5	21.09	14.58	6.51	54	-32.91	100	204	Average
2483.5	51.89	45.38	6.51	74	-22.11	100	204	Peak
4882	20.25	7.82	12.43	54	-33.75	101	118	Average
4882	51.05	38.62	12.43	74	-22.95	101	118	Peak
7323	23.76	9.43	14.33	54	-30.24	102	211	Average
7323	54.56	40.23	14.33	74	-19.44	102	211	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	40.58	34.36	6.22	54	-13.42	100	258	Average
2390	51.74	45.52	6.22	74	-22.26	100	258	Peak
2441	60.47	54.07	6.4	-----	-----	100	258	Average
2441	91.27	84.87	6.4	-----	-----	100	258	Peak
2483.5	21.07	14.56	6.51	54	-32.93	100	258	Average
2483.5	51.87	45.36	6.51	74	-22.13	100	258	Peak
4882	19.35	6.92	12.43	54	-34.65	111	302	Average
4882	50.15	37.72	12.43	74	-23.85	111	302	Peak
7323	24.9	10.57	14.33	54	-29.1	105	299	Average
7323	55.7	41.37	14.33	74	-18.3	105	299	Peak

Remarks:

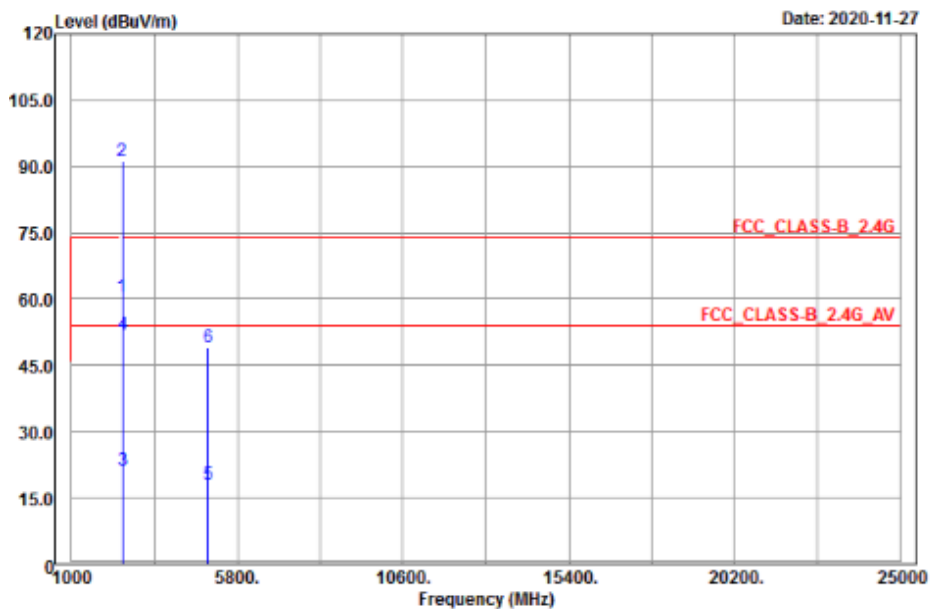
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2441 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 78	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz (System)	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	67.2	60.71	6.49	-----	-----	189	205	Average
2480	98	91.51	6.49	-----	-----	189	205	Peak
2483.5	21.38	14.87	6.51	54	-32.62	189	205	Average
2483.5	52.18	45.67	6.51	74	-21.82	189	205	Peak
4960	19.97	7.43	12.54	54	-34.03	199	220	Average
4960	50.77	38.23	12.54	74	-23.23	199	220	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	60.37	53.88	6.49	-----	-----	100	258	Average
2480	91.17	84.68	6.49	-----	-----	100	258	Peak
2483.5	21.2	14.69	6.51	54	-32.8	100	258	Average
2483.5	52	45.49	6.51	74	-22	100	258	Peak
4960	18.09	5.55	12.54	54	-35.91	104	211	Average
4960	48.89	36.35	12.54	74	-25.11	104	211	Peak

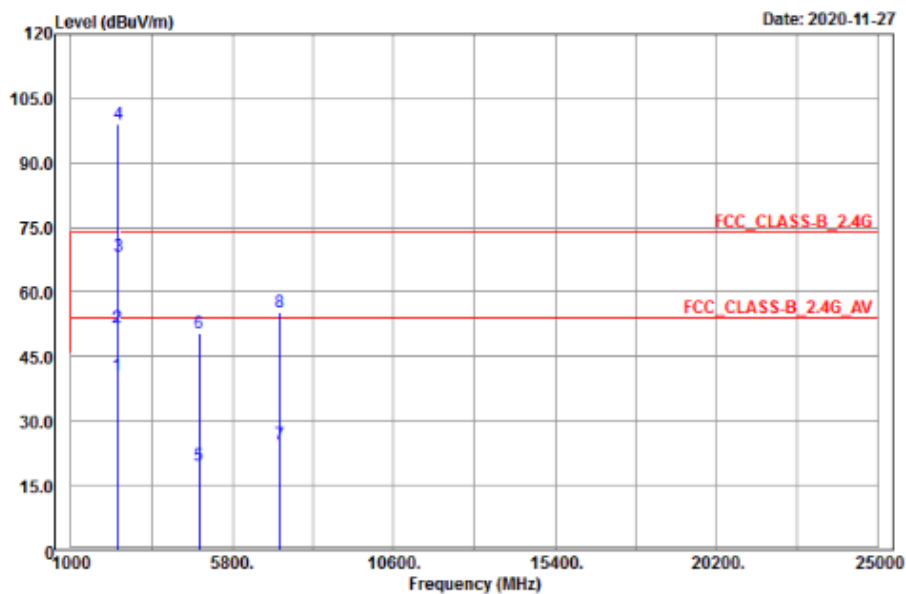
Remarks:

1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2480 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

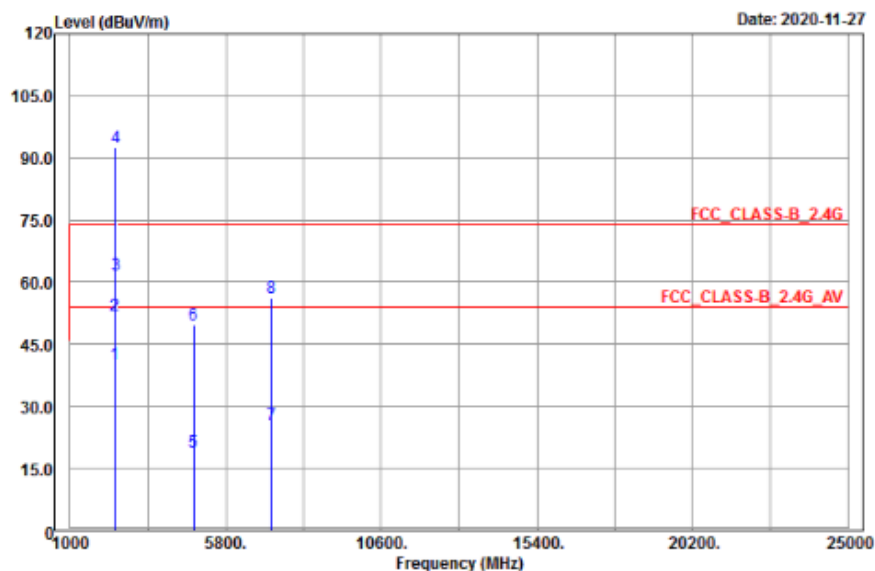
8DPSK

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz (System)	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	40.54	34.32	6.22	54	-13.46	100	204	Average
2390	51.74	45.52	6.22	74	-22.26	100	204	Peak
2402	68.4	62.16	6.24	-----	-----	100	204	Average
2402	99.18	92.94	6.24	-----	-----	100	204	Peak
4804	19.63	7.38	12.25	54	-34.37	102	122	Average
4804	50.41	38.16	12.25	74	-23.59	102	122	Peak
7206	24.42	10.09	14.33	48.4	-23.98	115	199	Average
7206	55.2	40.87	14.33	79.18	-23.98	115	199	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	40.31	34.09	6.22	54	-13.69	100	258	Average
2390	52.11	45.89	6.22	74	-21.89	100	258	Peak
2402	61.81	55.57	6.24	-----	-----	100	258	Average
2402	92.59	86.35	6.24	-----	-----	100	258	Peak
4804	18.87	6.62	12.25	54	-35.13	102	300	Average
4804	49.65	37.4	12.25	74	-24.35	102	300	Peak
7206	25.54	11.21	14.33	41.81	-16.27	101	302	Average
7206	56.32	41.99	14.33	72.59	-16.27	101	302	Peak

Remarks:

1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2402 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz (System)	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

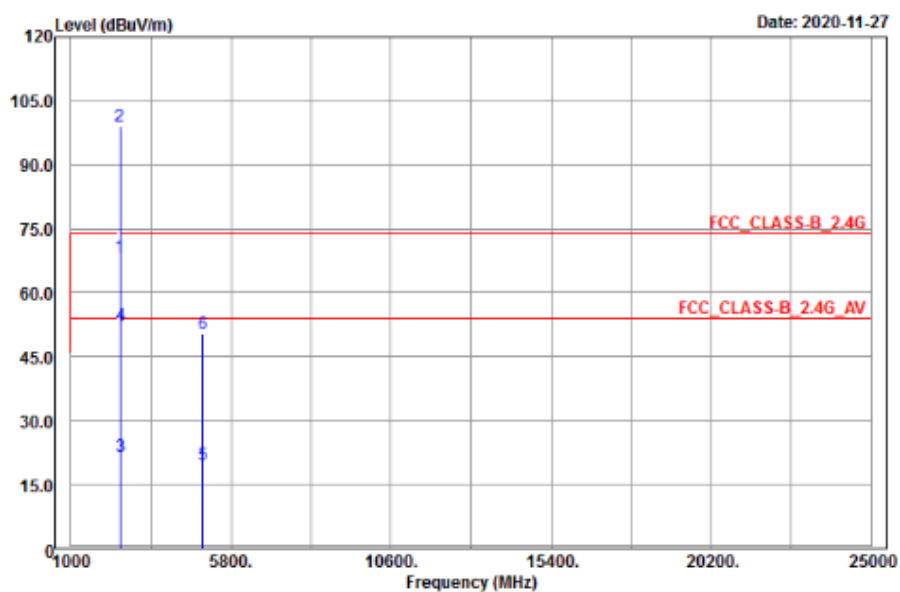
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	40.45	34.23	6.22	54	-13.55	100	205	Average
2390	52.36	46.14	6.22	74	-21.64	100	205	Peak
2441	68.54	62.14	6.4	-----	-----	189	205	Average
2441	99.32	92.92	6.4	-----	-----	189	205	Peak
2483.5	21.07	14.56	6.51	54	-32.93	100	205	Average
2483.5	51.85	45.34	6.51	74	-22.15	100	205	Peak
4882	19.36	6.93	12.43	54	-34.64	133	124	Average
4882	50.14	37.71	12.43	74	-23.86	133	124	Peak
7323	24.65	10.32	14.33	54	-29.35	102	215	Average
7323	55.43	41.1	14.33	74	-18.57	102	215	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	40.61	34.39	6.22	54	-13.39	100	258	Average
2390	51.76	45.54	6.22	74	-22.24	100	258	Peak
2441	61.32	54.92	6.4	-----	-----	100	258	Average
2441	92.1	85.7	6.4	-----	-----	100	258	Peak
2483.5	21.38	14.87	6.51	54	-32.62	100	258	Average
2483.5	52.16	45.65	6.51	74	-21.84	100	258	Peak
4882	18.87	6.44	12.43	54	-35.13	103	303	Average
4882	49.65	37.22	12.43	74	-24.35	103	303	Peak
7323	22.88	8.55	14.33	54	-31.12	101	302	Average
7323	53.66	39.33	14.33	74	-20.34	101	302	Peak

Remarks:

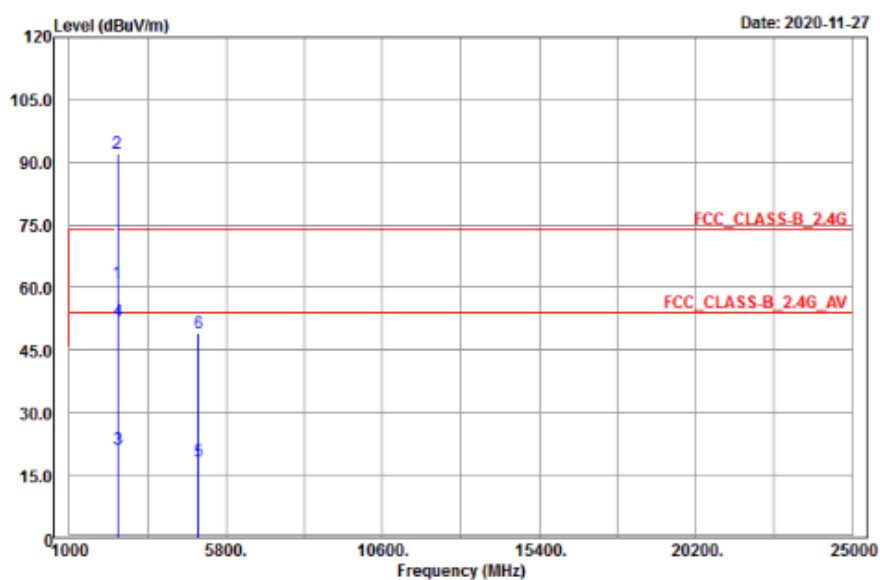
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2441 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 78	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz (System)	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	68.38	61.89	6.49	-----	-----	189	205	Average
2480	99.16	92.67	6.49	-----	-----	189	205	Peak
2483.5	21.62	15.11	6.51	54	-32.38	189	205	Average
2483.5	52.4	45.89	6.51	74	-21.6	189	205	Peak
4960	19.7	7.16	12.54	54	-34.3	102	120	Average
4960	50.48	37.94	12.54	74	-23.52	102	120	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	61.27	54.78	6.49	-----	-----	100	258	Average
2480	92.05	85.56	6.49	-----	-----	100	258	Peak
2483.5	21.36	14.85	6.51	54	-32.64	100	258	Average
2483.5	52.14	45.63	6.51	74	-21.86	100	258	Peak
4960	18.42	5.88	12.54	54	-35.58	101	300	Average
4960	49.2	36.66	12.54	74	-24.8	101	300	Peak

Remarks:

1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2480 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

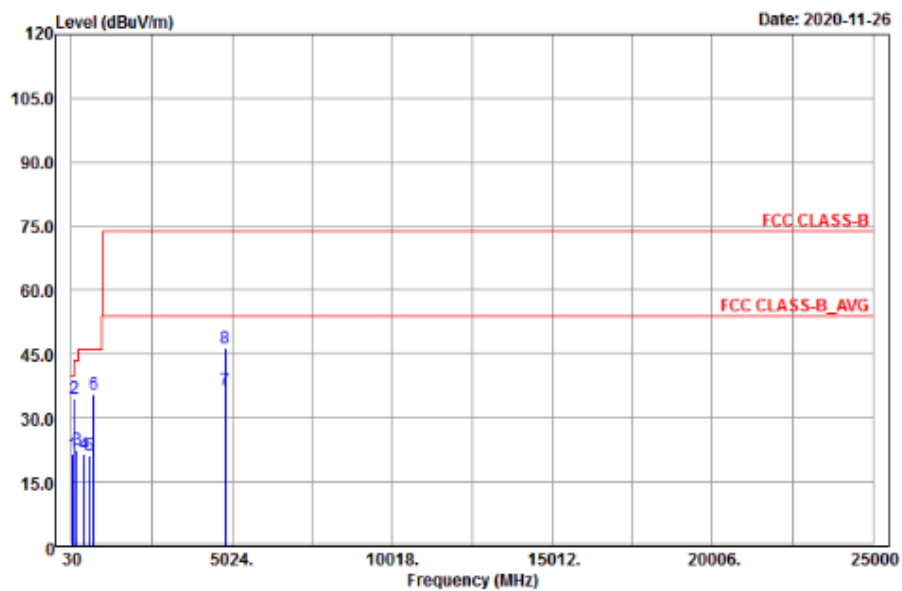
4.6.2 接收諧波

測試模式 A

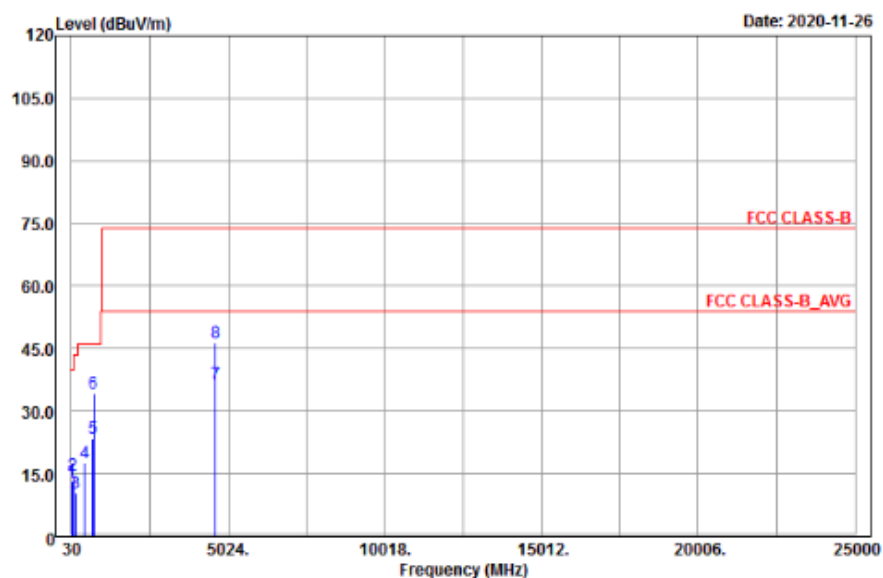
8DPSK

EUT Test Condition		Measurement Detail	
Channel	Channel 78	Frequency Range	30 MHz ~ 25 GHz
Input Power	110 Vac, 60 Hz (System)	Detector Function	Above 1 GHz: Peak (PK) & Average (AV) Below 1 GHz: Peak (PK) or Quasi-Peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
55.25	21.56	43.95	-22.39	40	-18.44	138	164	QP
95.17	34.68	54.85	-20.17	43.5	-8.82	116	208	QP
194.25	22.64	41.35	-18.71	43.5	-20.86	245	104	QP
417.5	21.69	32.67	-10.98	46	-24.31	104	198	QP
585.43	21.18	29.33	-8.15	46	-24.82	129	150	QP
715.64	35.58	40.68	-5.1	46	-10.42	204	137	QP
4825.13	36.57	26.28	10.29	54	-17.43	204	129	Average
4825.13	46.57	36.28	10.29	74	-27.43	204	129	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
51.67	13.27	35.34	-22.07	40	-26.73	146	155	QP
91.74	14.66	35.09	-20.43	43.5	-28.84	165	204	QP
163.29	10.41	29.28	-18.87	43.5	-33.09	187	82	QP
454.28	17.56	28.21	-10.65	46	-28.44	115	169	QP
704.15	23.68	28.98	-5.3	46	-22.32	154	211	QP
733.6	34.49	39.44	-4.95	46	-11.51	158	112	QP
4629.47	36.49	26.32	10.17	54	-17.51	134	180	Average
4629.47	46.49	36.32	10.17	74	-27.51	134	180	Peak

Remarks:

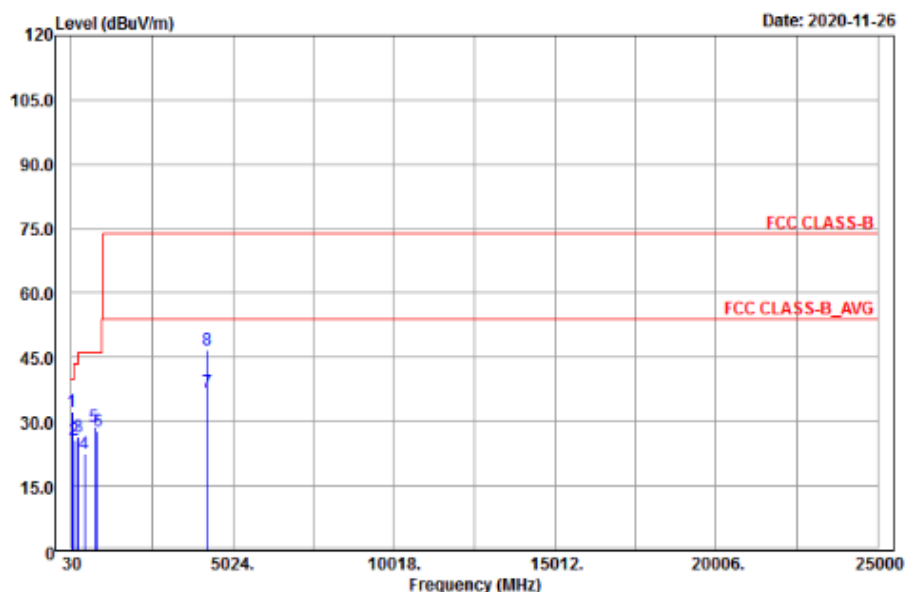
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level – Limit value
2. The other emission levels were very low against the limit.

測試模式 B

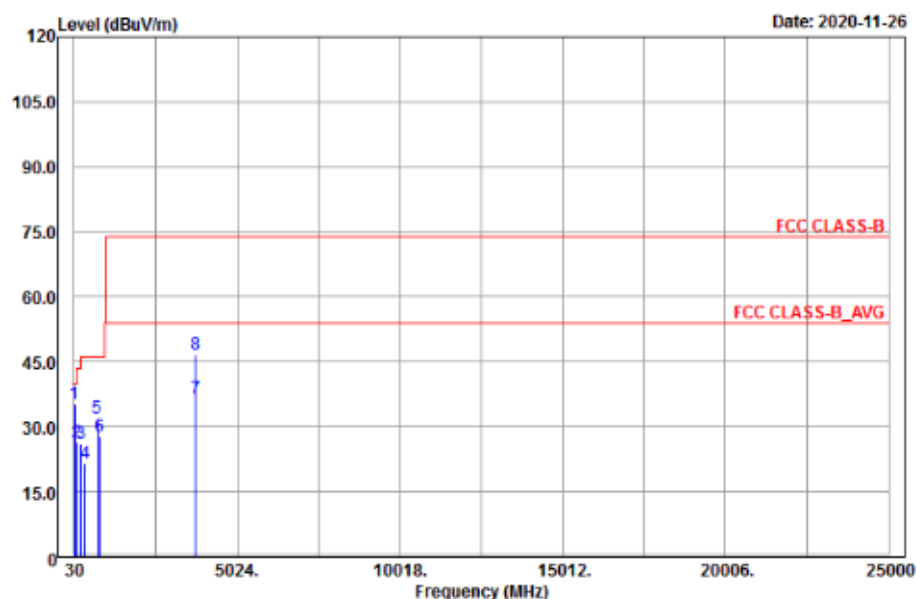
GFSK

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	30 MHz ~ 25 GHz
Input Power	110 Vac, 60 Hz (System)	Detector Function	Above 1 GHz: Peak (PK) & Average (AV) Below 1 GHz: Peak (PK) or Quasi-Peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
43.54	32.45	47.99	-15.54	40	-7.55	168	194	QP
131.944	25.67	46.22	-20.55	43.5	-17.83	165	94	QP
245.178	26.47	43.4	-16.93	46	-19.53	160	281	QP
432.54	22.62	36.13	-13.51	46	-23.38	128	315	QP
735.45	28.75	37.37	-8.62	46	-17.25	164	108	QP
850.17	27.69	34.49	-6.8	46	-18.31	104	195	QP
4227	36.84	27.57	9.27	54	-17.16	247	104	Average
4227	46.84	37.57	9.27	74	-27.16	247	104	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
41.15	35.25	51.38	-16.13	40	-4.75	154	106	QP
104.32	26.47	43.58	-17.11	43.5	-17.03	185	224	QP
238.55	26.24	43.32	-17.08	46	-19.76	135	276	QP
364.24	21.57	36.05	-14.48	46	-24.43	108	29	QP
745.29	31.98	40.52	-8.54	46	-14.02	109	274	QP
816.59	27.69	35.12	-7.43	46	-18.31	136	254	QP
3755	36.68	28.81	7.87	54	-17.32	165	104	Average
3755	46.68	38.81	7.87	74	-27.32	165	104	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level – Limit value
- The other emission levels were very low against the limit.

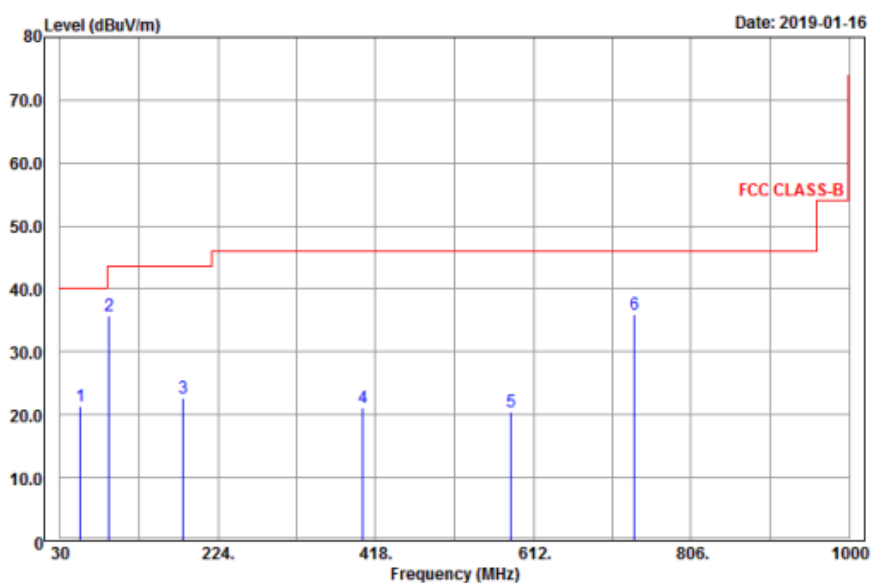
4.6.3 其它不必要之訊號

測試模式 A

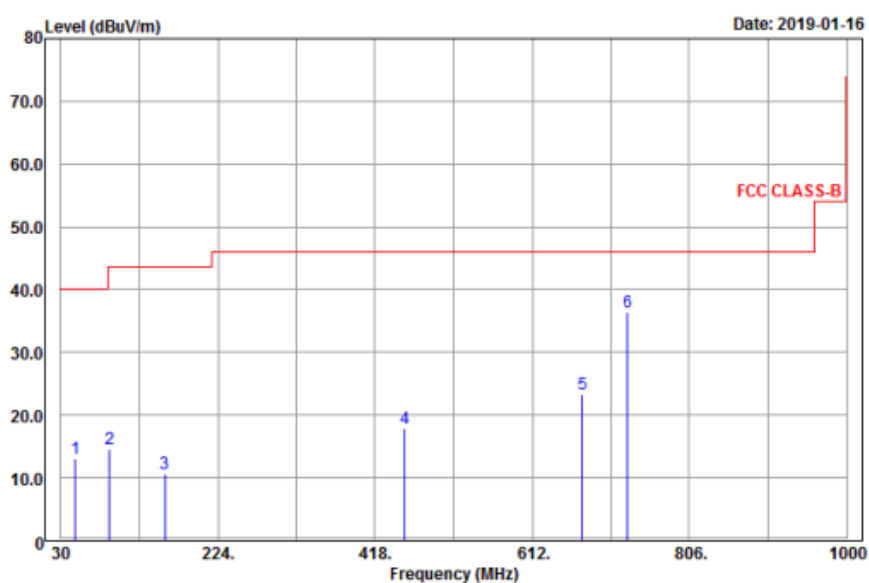
8DPSK

EUT Test Condition		Measurement Detail	
Channel	Channel 78	Frequency Range	30 MHz ~ 1 GHz
Input Power	110 Vac, 60 Hz (System)	Detector Function	Peak (PK) or Quask-Peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Harry Hsueh

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
54.84	21.35	45.38	40	-18.65	7.3	0.9	32.23	142	195	QP
90.48	35.8	57.46	43.5	-7.7	8.94	1.11	31.71	102	155	QP
181.47	22.78	43.01	43.5	-20.72	10.4	1.61	32.24	114	187	QP
402.2	21.25	33.07	46	-24.75	18.06	2.34	32.22	113	162	QP
584.9	20.53	29.43	46	-25.47	20.48	2.82	32.2	144	159	QP
736.8	35.91	41.58	46	-10.09	23.3	3.16	32.13	103	162	QP
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
48.36	13.04	36.05	40	-26.96	8.31	0.9	32.22	152	118	QP
90.21	14.59	36.25	43.5	-28.91	8.94	1.11	31.71	144	187	QP
158.79	10.78	30.79	43.5	-32.72	10.74	1.52	32.27	102	30	QP
454.7	17.88	29.35	46	-28.12	18.18	2.49	32.14	123	162	QP
673.8	23.23	28.9	46	-22.77	23.4	3.05	32.12	118	175	QP
729.8	36.39	41.98	46	-9.61	23.37	3.16	32.12	102	154	QP

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin Value = Emission Level – Limit value

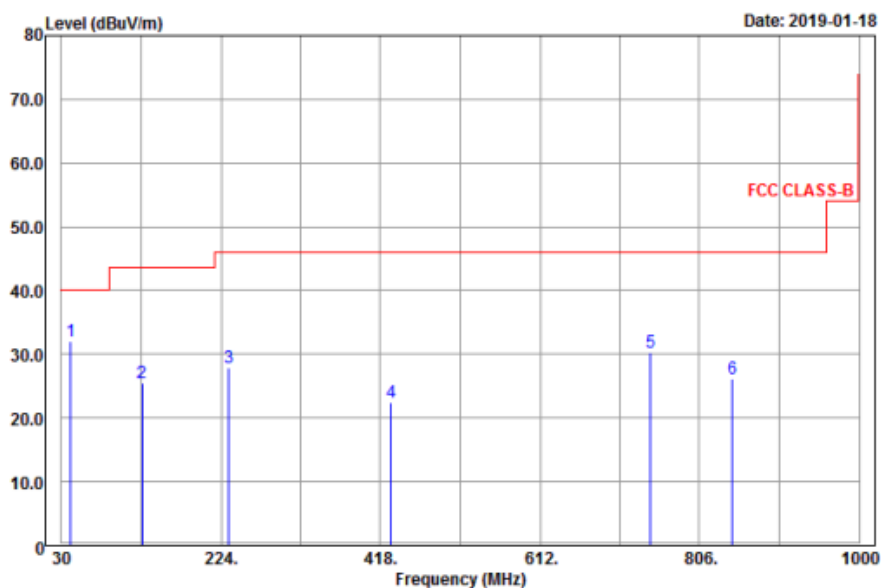
2. The other emission levels were very low against the limit.

測試模式 B

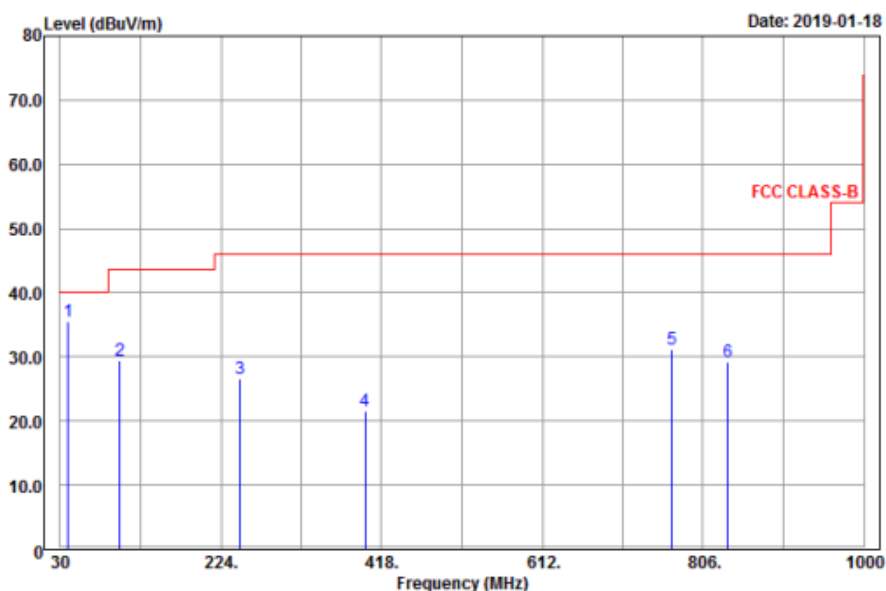
GFSK

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	30 MHz ~ 1 GHz
Input Power	110 Vac, 60 Hz (System)	Detector Function	Peak (PK) or Quask-Peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



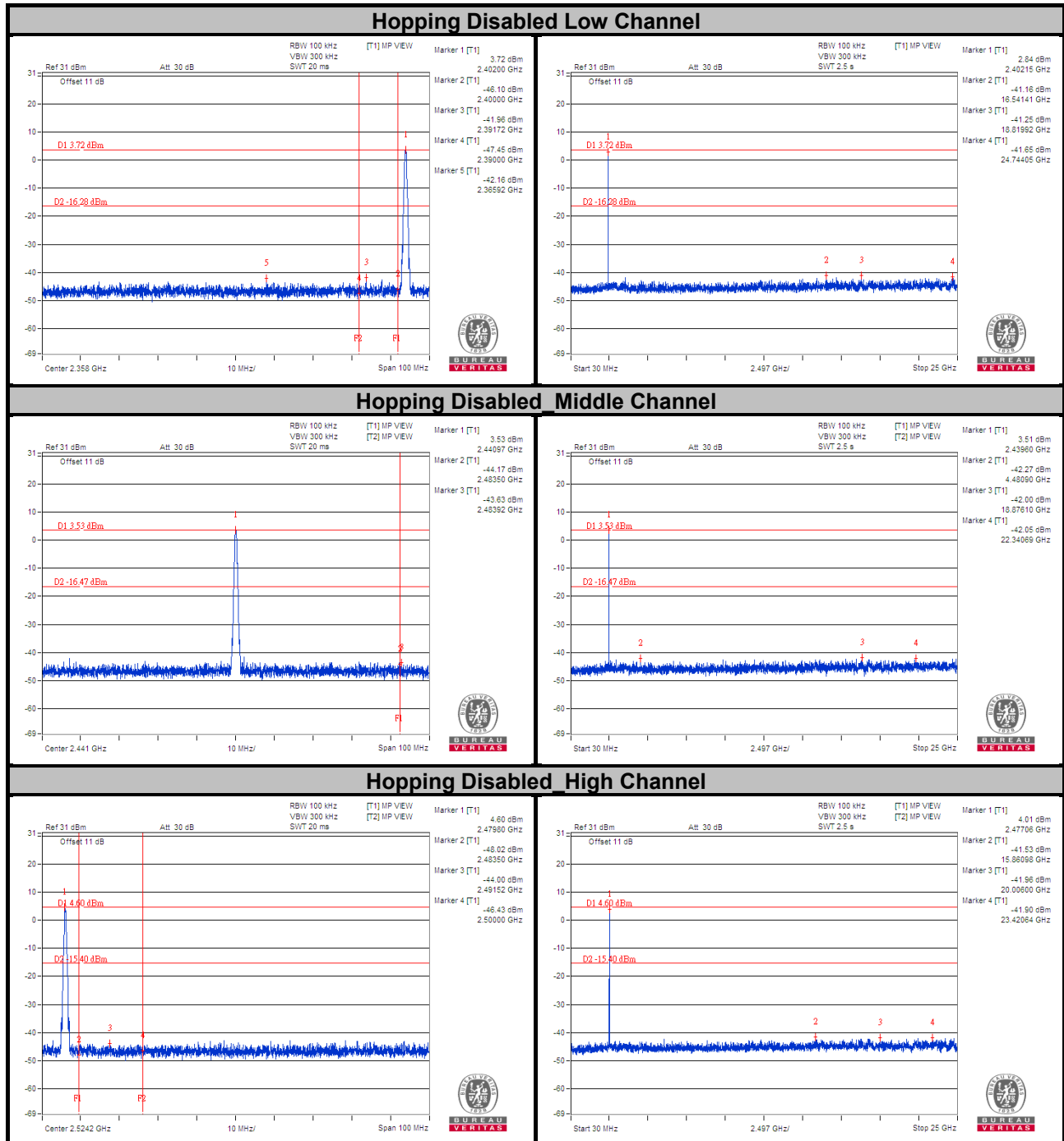
Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
41.61	32.06	49.76	40	-7.94	13.78	0.74	32.22	135	229	QP
128.01	25.56	47.21	43.5	-17.94	9.2	1.38	32.23	105	111	QP
233.31	27.82	46.24	46	-18.18	11.89	1.85	32.16	134	16	QP
430.9	22.55	36.99	46	-23.45	15.33	2.41	32.18	134	136	QP
746.6	30.26	39.4	46	-15.74	19.78	3.22	32.14	197	216	QP
846	26.19	33.66	46	-19.81	20.97	3.38	31.82	124	261	QP
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
39.72	35.53	53.61	40	-4.47	13.41	0.74	32.23	174	229	QP
101.82	29.4	48.04	43.5	-14.1	12.34	1.28	32.26	101	326	QP
247.08	26.64	44.65	46	-19.36	12.25	1.85	32.11	104	180	QP
398	21.67	36.6	46	-24.33	14.95	2.34	32.22	134	16	QP
768.3	31.18	40.07	46	-14.82	20	3.22	32.11	124	200	QP
836.2	29.32	36.97	46	-16.68	20.84	3.38	31.87	124	166	QP

Remarks:

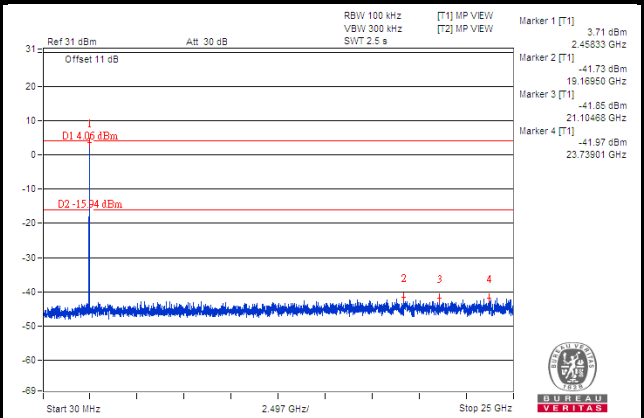
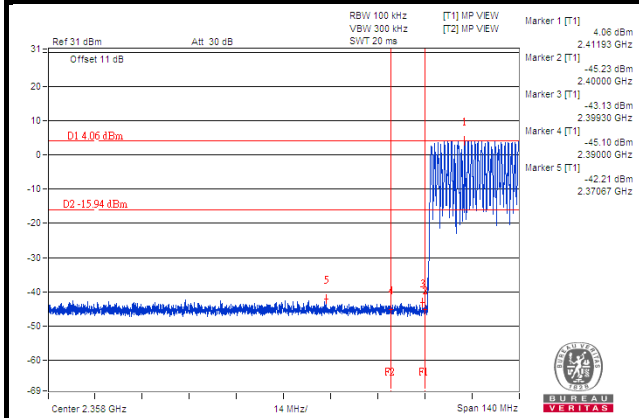
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level – Limit value
- The other emission levels were very low against the limit.

4.7 帶外發射之量測 (傳導)

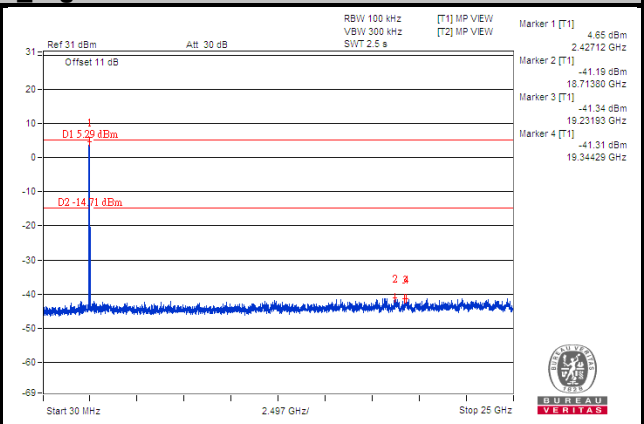
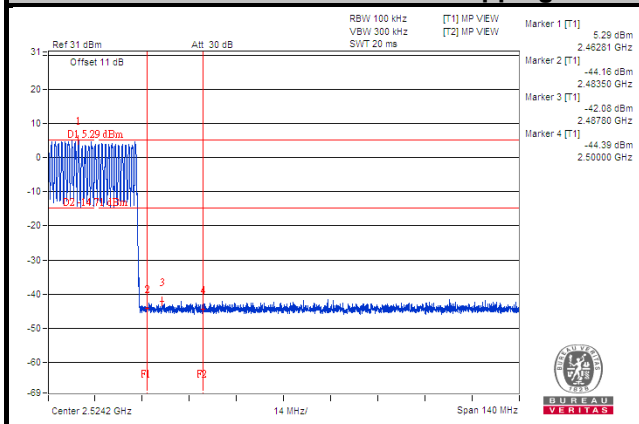
GFSK



Hopping Enabled_Low Channel

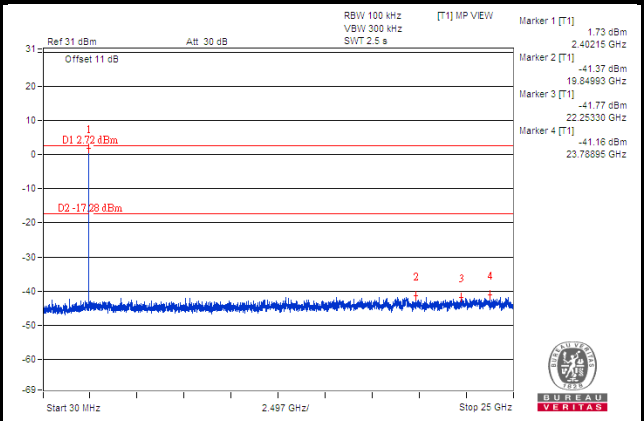
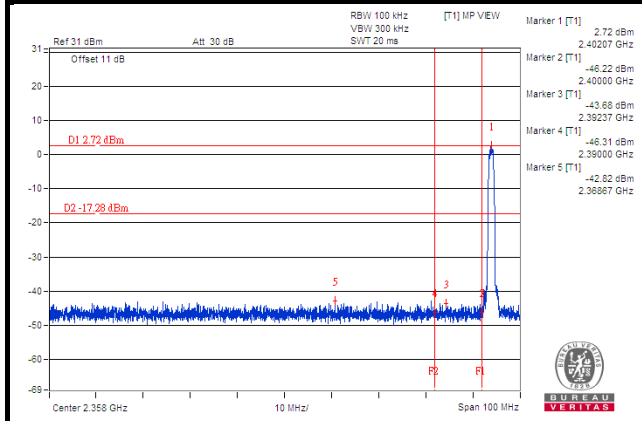


Hopping Enabled_High Channel

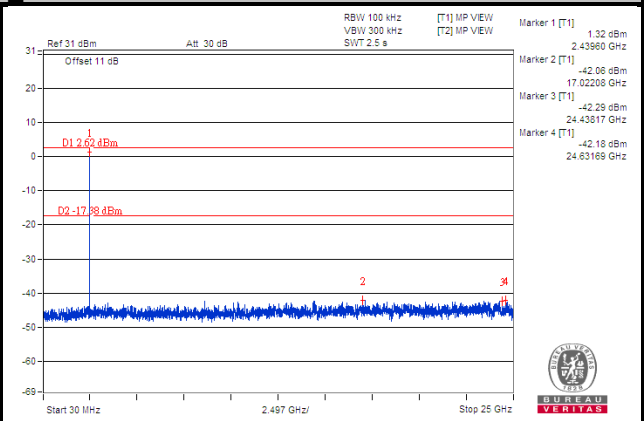
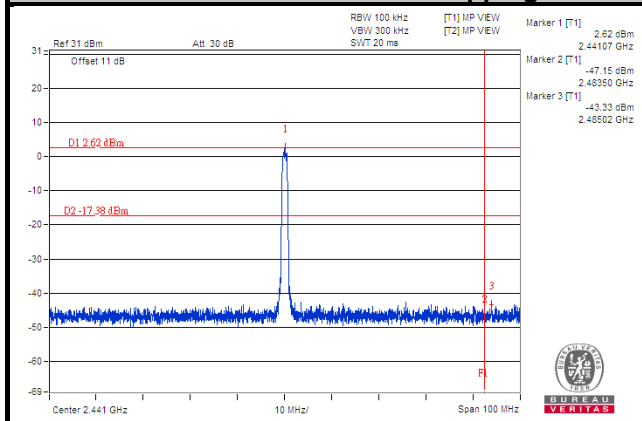


8DPSK

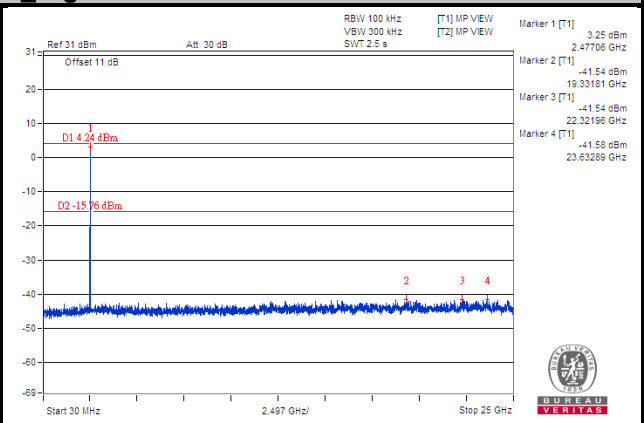
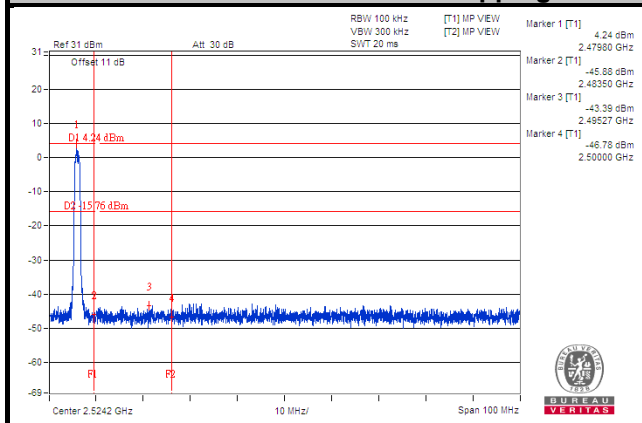
Hopping Disabled Low Channel

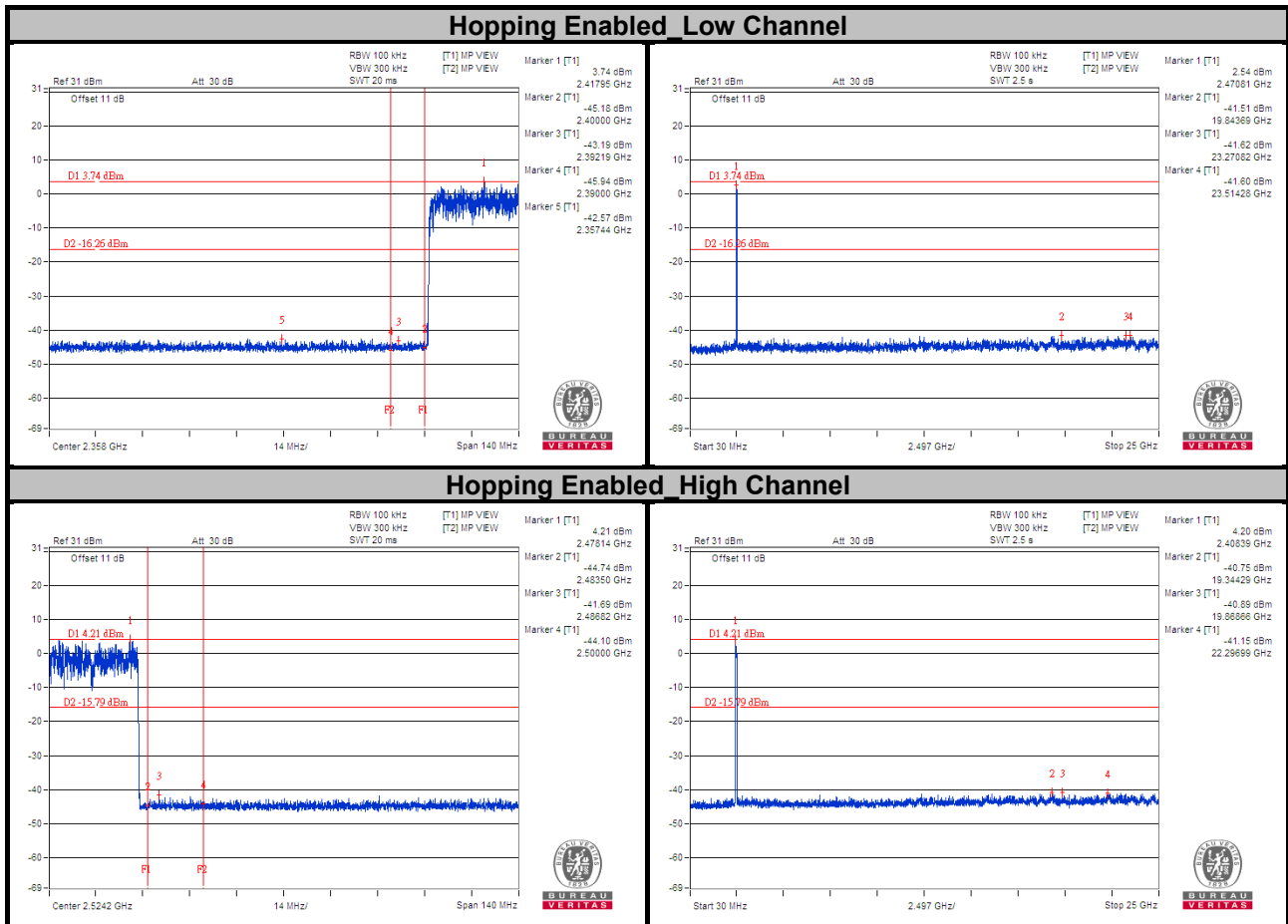


Hopping Disabled Middle Channel



Hopping Disabled High Channel





4.8 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

4.9 配置照片

請參閱附件測試設置照片(BV CPS 報告編號：BAYS-WTW-P20110319_TSup)。

5 電源線傳導干擾之量測

5.1 適用標準

請見本報告3.1節第1項的規定。

5.2 量測方法

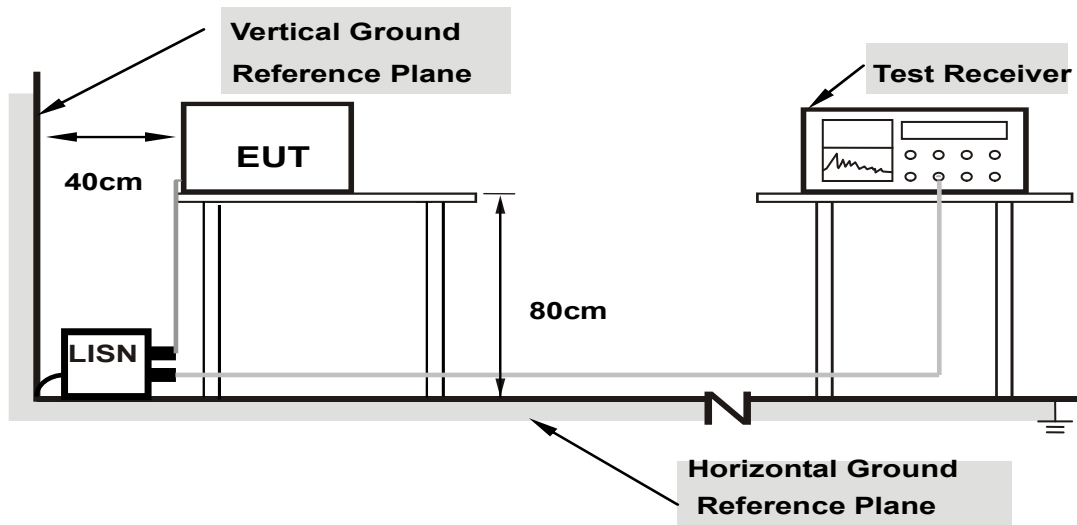
將待測物置於0.8米高的非金屬桌面，使其操作在工作狀態，待測物電源線接至電源線阻抗穩定網路上，從測試接收機記錄頻率由0.15MHz至30MHz之間之電源線傳導放射強度。

5.3 量測儀器

儀器名稱 (廠牌/製造商)	型號	序號	校正日期	下次校正日期
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 10, 2018	Dec. 09, 2019
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2018	Sep. 04, 2019
LISN/AMN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 26, 2018	Feb. 25, 2019
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 19, 2018	Aug. 18, 2019
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 1 (Conduction 1).
 3. The VCCI Site Registration No. is C-12040.
 4. The measurement uncertainty is 2.79 dB, which is calculated as per the document CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

5.4 測試配置



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

5.5 干擾值之計算

餘裕度Margin(dB)= 結果值Emission level (dBuV)-限制值Limit value (dBuV)

電源傳導干擾電壓之計算公式如下

結果值Emission level (dBuV)=校正因子Correction Factor (dB)+儀器讀值Reading value (dBuV)

其中校正因子Correction Factor (dB)為：

饋線損失+電源阻抗模擬網路損失

5.6 量測結果

測試模式 A

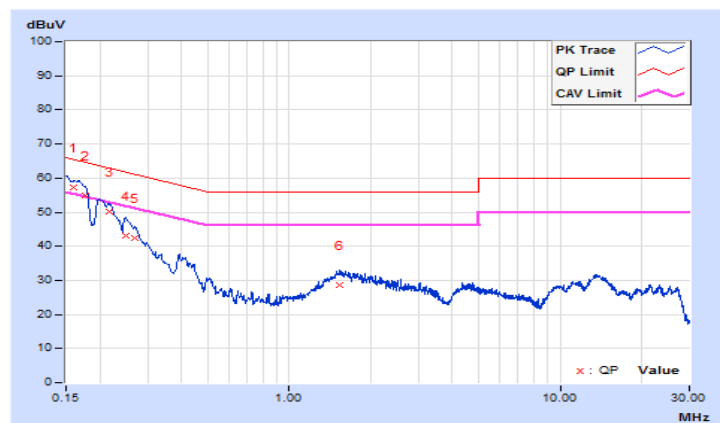
8DPSK

操作模式	發射/接收	測試日期	108 年 01 月 18 日
基本波頻率	CH 78 : 2480 MHz	量測場地溫度	25°C
調變技術	8DPSK	量測場地濕度	65%RH
測試者	王紀雄		

		6 dB Bandwidth: 9kHz				PHASE: LINE (L)			
輻射頻率	校正因子	儀器讀值		結果值		限制值		餘裕度	
[MHz]	[dB]	[dB (uV)]		[dB (uV)]		[dB (uV)]		[dB]	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.15966	10.05	47.18	27.74	57.23	37.79	65.48	55.48	-8.25	-17.69
0.17700	10.06	44.84	22.71	54.90	32.77	64.63	54.63	-9.73	-21.86
0.21573	10.06	40.07	22.47	50.13	32.53	62.98	52.98	-12.85	-20.45
0.24814	10.06	33.20	14.39	43.26	24.45	61.82	51.82	-18.56	-27.37
0.26930	10.06	32.33	17.00	42.39	27.06	61.14	51.14	-18.75	-24.08
1.53833	10.08	18.61	4.54	28.69	14.62	56.00	46.00	-27.31	-31.38

Note:

- 1.Q.P. and AV. are abbreviations of quasi-peak and average individually.
- 2.The emission levels of other frequencies were very low against the limit.
- 3.Margin value = Emission level - Limit value
- 4.Correction factor = Insertion loss + Cable loss
- 5.Emission Level = Correction Factor + Reading Value.

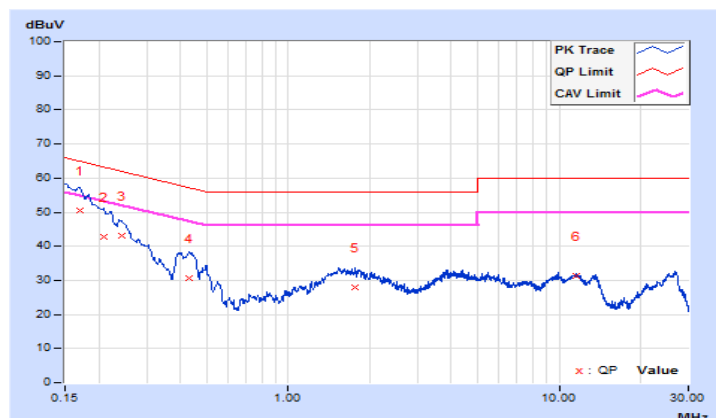


操作模式	發射/接收	測試日期	108 年 01 月 18 日
基本波頻率	CH 78 : 2480 MHz	量測場地溫度	25°C
調變技術	8DPSK	量測場地濕度	65%RH
測試者	王紀雄		

		6 dB Bandwidth: 9kHz				PHASE: NEUTRAL (N)			
輻射頻率	校正因子	儀器讀值		結果值		限制值		餘裕度	
[MHz]	[dB]	[dB (uV)]		[dB (uV)]		[dB (uV)]		[dB]	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.17025	10.06	40.33	14.83	50.39	24.89	64.95	54.95	-14.56	-30.06
0.20846	10.07	32.80	15.67	42.87	25.74	63.27	53.27	-20.40	-27.53
0.24225	10.07	33.09	17.51	43.16	27.58	62.02	52.02	-18.86	-24.44
0.42900	10.07	20.45	5.73	30.52	15.80	57.27	47.27	-26.75	-31.47
1.77225	10.09	17.77	5.35	27.86	15.44	56.00	46.00	-28.14	-30.56
11.49675	10.41	20.89	3.92	31.30	14.33	60.00	50.00	-28.70	-35.67

Note:

- 1.Q.P. and AV. are abbreviations of quasi-peak and average individually.
- 2.The emission levels of other frequencies were very low against the limit.
- 3.Margin value = Emission level - Limit value
- 4.Corrected factor = Insertion loss + Cable loss
- 5.Emission Level = Correction Factor + Reading Value.



測試模式 B

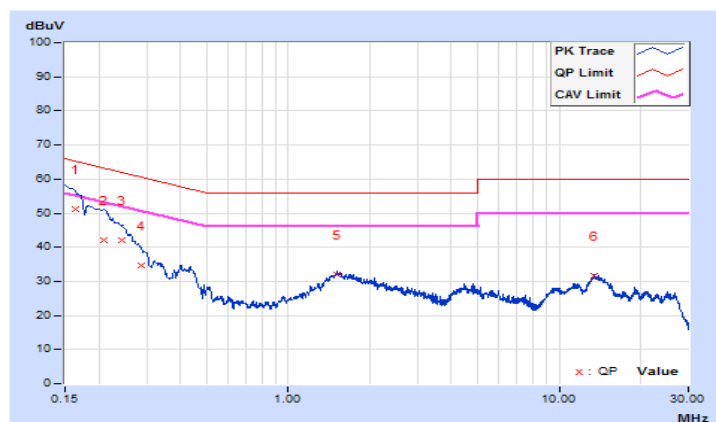
GFSK

操作模式	發射/接收	測試日期	108 年 01 月 18 日
基本波頻率	CH 0 : 2402 MHz	量測場地溫度	25°C
調變技術	GFSK	量測場地濕度	65%RH
測試者	王紀雄		

		6 dB Bandwidth: 9kHz				PHASE: LINE (L)			
輻射頻率	校正因子	儀器讀值		結果值		限制值		餘裕度	
[MHz]	[dB]	[dB (uV)]		[dB (uV)]		[dB (uV)]		[dB]	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.16350	10.05	41.15	14.92	51.20	24.97	65.28	55.28	-14.08	-30.31
0.20791	10.06	32.03	12.80	42.09	22.86	63.29	53.29	-21.20	-30.43
0.24295	10.06	31.95	15.41	42.01	25.47	61.99	51.99	-19.98	-26.52
0.28616	10.06	24.63	11.16	34.69	21.22	60.64	50.64	-25.95	-29.42
1.51415	10.08	21.93	3.07	32.01	13.15	56.00	46.00	-23.99	-32.85
13.51500	10.38	21.26	6.83	31.64	17.21	60.00	50.00	-28.36	-32.79

Note:

- 1.Q.P. and AV. are abbreviations of quasi-peak and average individually.
- 2.The emission levels of other frequencies were very low against the limit.
- 3.Margin value = Emission level - Limit value
- 4.Correction factor = Insertion loss + Cable loss
- 5.Emission Level = Correction Factor + Reading Value.

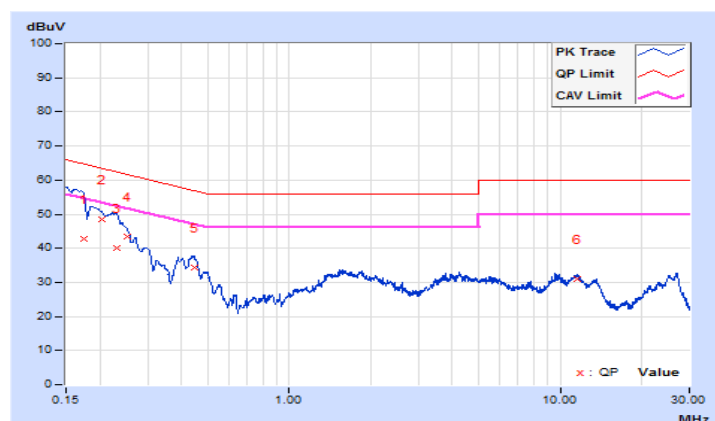


操作模式	發射/接收	測試日期	108 年 01 月 18 日
基本波頻率	CH 0 : 2402 MHz	量測場地溫度	25°C
調變技術	GFSK	量測場地濕度	65%RH
測試者	王紀雄		

		6 dB Bandwidth: 9kHz				PHASE: NEUTRAL (N)			
輻射頻率	校正因子	儀器讀值		結果值		限制值		餘裕度	
[MHz]	[dB]	[dB (uV)]		[dB (uV)]		[dB (uV)]		[dB]	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.17475	10.06	32.73	10.93	42.79	20.99	64.73	54.73	-21.94	-33.74
0.20400	10.07	38.27	21.64	48.34	31.71	63.45	53.45	-15.11	-21.74
0.23100	10.07	29.88	11.42	39.95	21.49	62.41	52.41	-22.46	-30.92
0.25125	10.07	33.53	21.39	43.60	31.46	61.72	51.72	-18.12	-20.26
0.44474	10.07	24.12	10.03	34.19	20.10	56.97	46.97	-22.78	-26.87
11.54175	10.41	20.68	4.72	31.09	15.13	60.00	50.00	-28.91	-34.87

Note:

- 1.Q.P. and AV. are abbreviations of quasi-peak and average individually.
- 2.The emission levels of other frequencies were very low against the limit.
- 3.Margin value = Emission level - Limit value
- 4.Correction factor = Insertion loss + Cable loss
- 5.Emission Level = Correction Factor + Reading Value.



5.7 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

5.8 配置照片

請參閱附件測試設置照片(BV CPS 報告編號：BAYS-WTW-P20110319_TSup)。

6 20 dB 頻寬之量測

6.1 適用標準

請見本報告3.1節第7項的規定。

6.2 量測方法

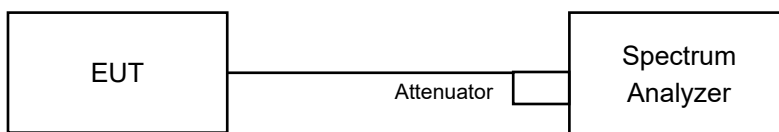
- 將待測物輸出經由衰减器接到頻譜分析儀上。
- 設定待測物處於連續發射狀態。
- 計算由最大輸出功率峰值減20dB的最大頻率範圍。

6.3 量測儀器

儀器名稱 (廠牌/製造商)	型號	序號	校正日期	下次校正日期
SPECTRUM ANALYZER R&S	FSV40	100980	Apr. 17, 2018	Apr. 16, 2019

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The measurement uncertainty is 207Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

6.4 測試配置



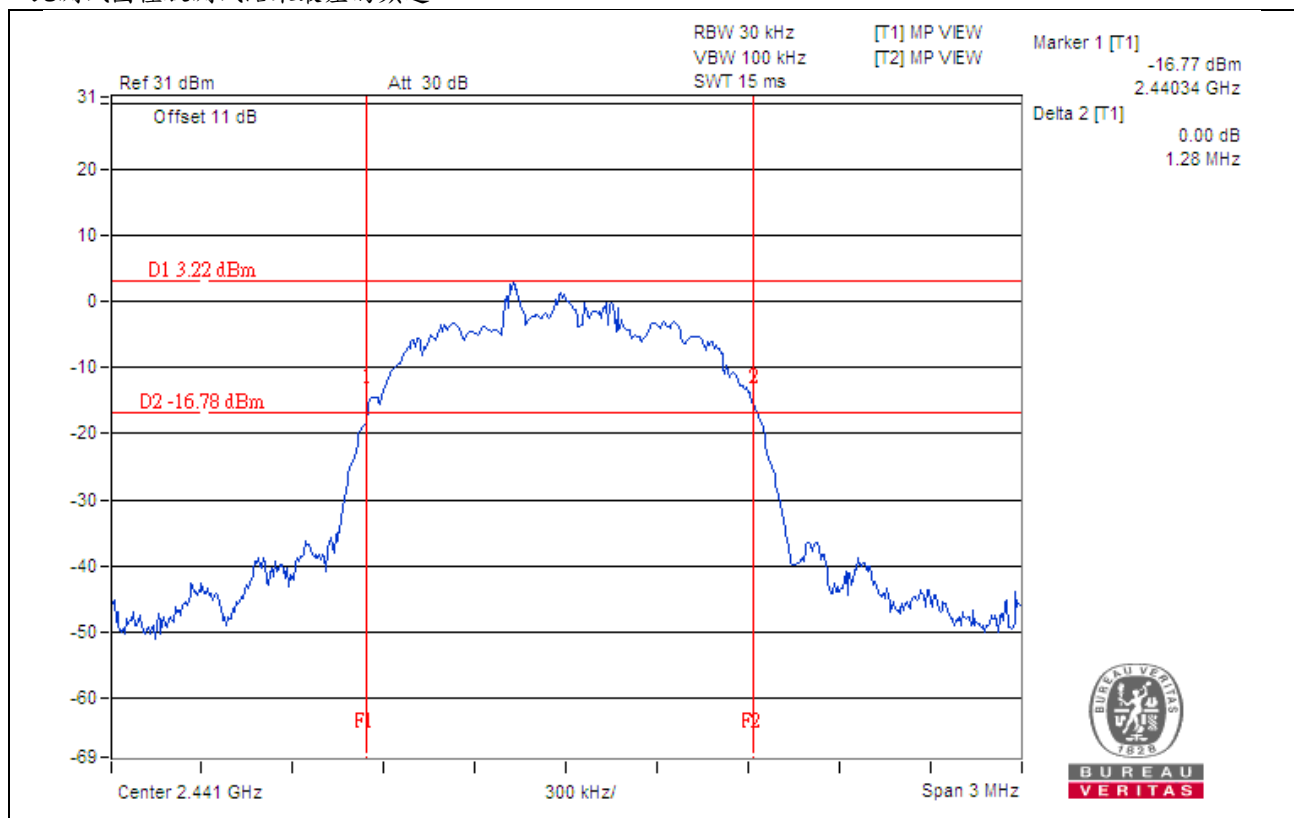
6.5 量測結果

操作模式	發射	測試日期	108 年 01 月 22 日
量測場地溫度	25°C	量測場地濕度	60%RH
測試者	吳俊樺		

Channel	Channel Frequency (MHz)	20dB Bandwidth (MHz)		>= 25kHz
		GFSK	8DPSK	
0	2402	0.95	1.30	Yes
39	2441	0.94	1.28	Yes
78	2480	0.95	1.30	Yes

註：依據國家通訊傳播委員會低功率射頻器材技術規範4.10.1.6節之規定，跳頻系統之載波頻率頻道間隔應大於或等於25 kHz 或跳頻頻道之20 dB頻寬，兩者取較寬者。但操作頻率為2400 MHz~2483.5 MHz 頻段且輸出功率應小於或等於125 mW 跳頻系統，其載波頻率頻道間隔不得小於25 kHz 或跳頻頻道20 dB頻寬之三分之二，兩者取較寬者。

**此測試圖僅放測試結果最差的頻道。



6.6 量測結果判定

依據測試數據結果，三分之二20dB頻寬值乃為此產品之載波頻率頻道間隔的判定限制值。

7 峰值傳導輸出功率之量測

7.1 適用標準

請見本報告3.1節第5項的規定。

7.2 量測方法

- 將待測物輸出接到功率計上。
- 設定待測物處於連續發射狀態。
- 量測待測物輸出功率峰值。

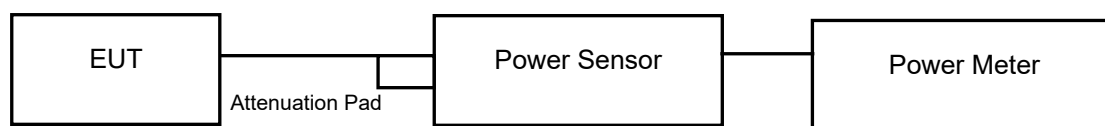
7.3 量測儀器

儀器名稱 (廠牌/製造商)	型號	序號	校正日期	下次校正日期
Power Meter Anritsu	ML2495A	1232002	Dec. 17, 2018	Dec. 16, 2019
Power Sensor Anritsu	MA2411B	1207325	Dec. 17, 2018	Dec. 16, 2019

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 1.393 dB, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of $k=2$.

7.4 測試配置



7.5 量測結果

操作模式	發射	測試日期	108 年 01 月 22 日
量測場地溫度	25°C	量測場地濕度	60%RH
測試者	吳俊樺		

For Peak Power

Channel	Frequency (MHz)	Peak Power (mW)		Peak Power (dBm)		Power Limit(mW)	Pass / Fail
		GFSK	8DPSK	GFSK	8DPSK		
0	2402	2.576	3.707	4.11	5.69	125.00 ^註	Pass
39	2441	2.455	3.357	3.90	5.26	125.00 ^註	Pass
78	2480	2.612	3.776	4.17	5.77	125.00 ^註	Pass

Note: 待測物操作頻率為2400 MHz~2483.5 MHz頻段，且輸出功率小於或等於125 mW，其載波頻率頻道間隔不小於跳頻頻道20 dB頻寬之三分之二，參考9.5節量測結果。

For Average Power

Channel	Frequency (MHz)	Power (mW)		Power (dBm)	
		GFSK	8DPSK	GFSK	8DPSK
0	2402	2.399	2.382	3.80	3.77
39	2441	2.307	2.168	3.63	3.36
78	2480	2.455	2.466	3.90	3.92

7.6 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

8 跳頻頻道數之量測

8.1 適用標準

請見本報告3.1節第6項的規定。

8.2 量測方法

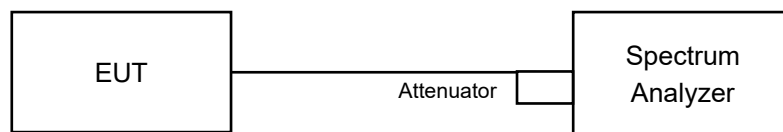
- 將待測物輸出接到頻譜分析儀上。
- 設定待測物處於正常傳輸跳頻模式下。
- 設定 RBW= 100kHz，VBW=300kHz，量測跳頻頻道數。

8.3 量測儀器

儀器名稱 (廠牌/製造商)	型號	序號	校正日期	下次校正日期
SPECTRUM ANALYZER R&S	FSV40	100980	Apr. 17, 2018	Apr. 16, 2019

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The measurement uncertainty is 207Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

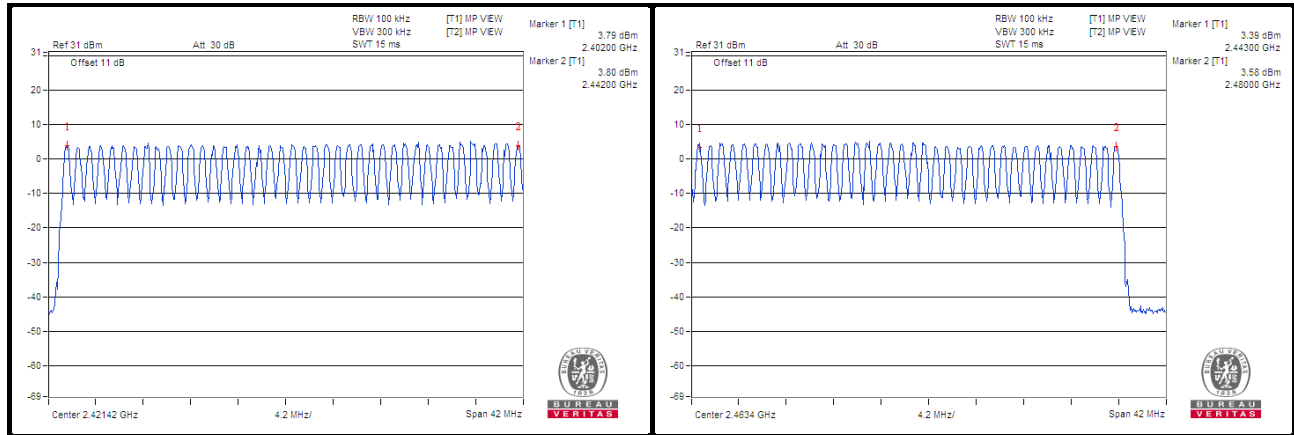
8.4 測試配置



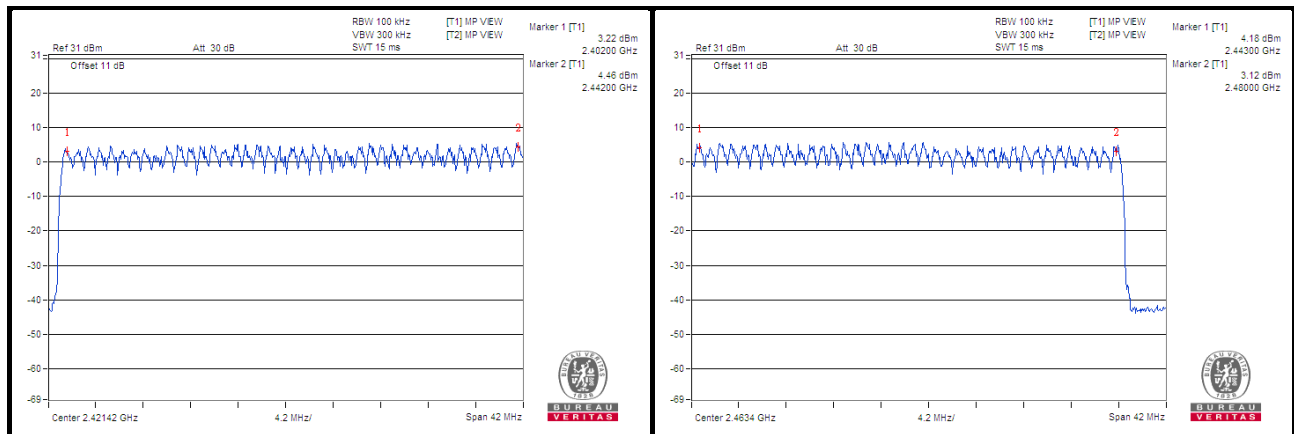
8.5 量測結果

其掃描圖請參閱下圖。跳頻頻道數共有79個，符合至少15個的規定。

<GFSK>



<8DPSK>



8.6 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

9 跳頻頻道間隔之量測

9.1 適用標準

請見本報告3.1節第7項規定。

9.2 量測方法

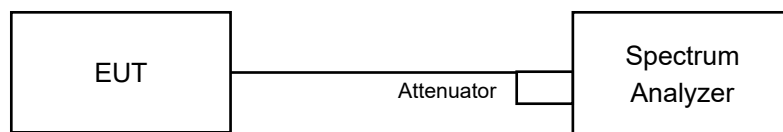
- 將待測物輸出接到頻譜分析儀上。
- 設定待測物處於連續發射狀態。
- 設定 RBW= 30kHz, VBW=300kHz，量測相鄰兩個頻道間的間隔。

9.3 量測儀器

儀器名稱 (廠牌/製造商)	型號	序號	校正日期	下次校正日期
SPECTRUM ANALYZER R&S	FSV40	100980	Apr. 17, 2018	Apr. 16, 2019

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The measurement uncertainty is 207Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

9.4 測試配置



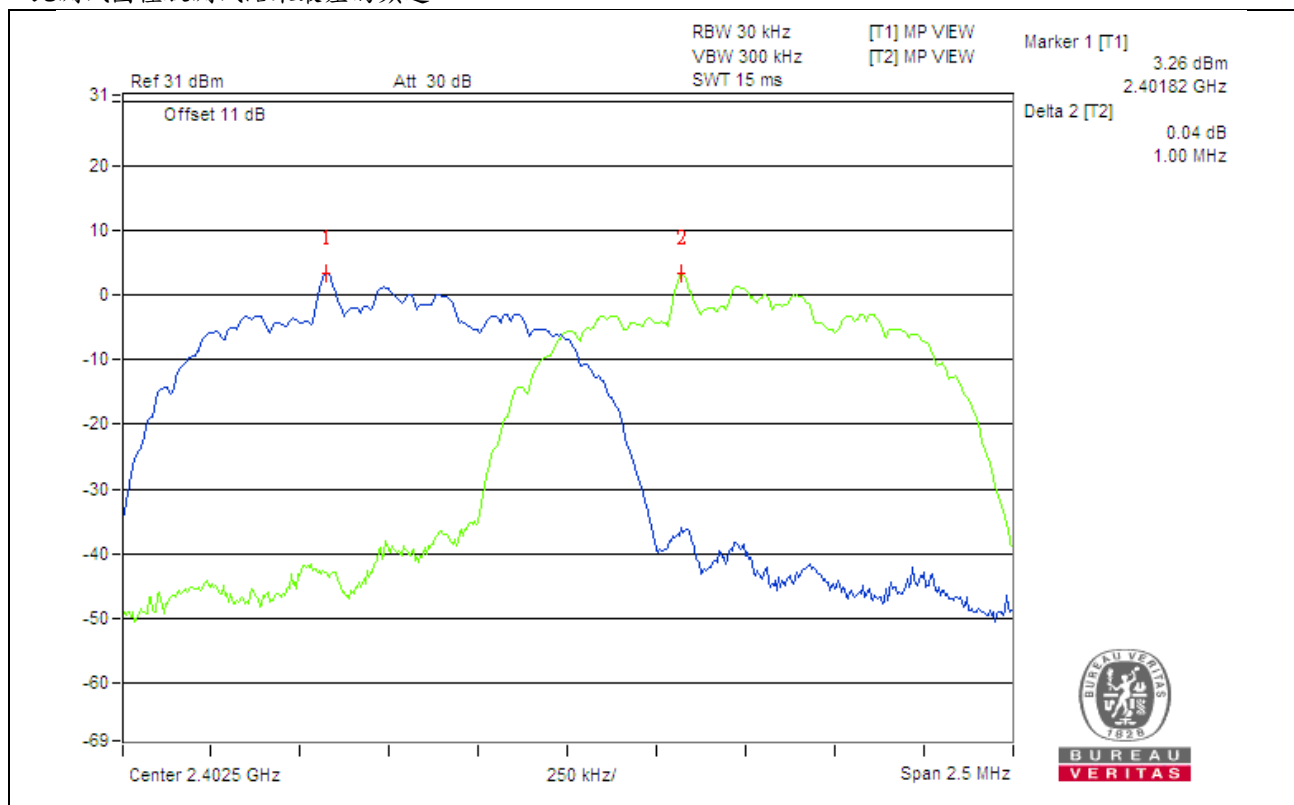
9.5 量測結果

操作模式	發射	測試日期	108 年 01 月 22 日
量測場地溫度	25°C	量測場地濕度	60%RH
測試者	吳俊樺		

Channel	Freq. (MHz)	Adjacent Channel Separation (MHz)		20 dB Bandwidth (MHz)		Minimum Limit (MHz)		Pass / Fail
		GFSK	8DPSK	GFSK	8DPSK	GFSK	8DPSK	
0	2402	1.00	1.00	0.95	1.30	0.64	0.87	Pass
39	2441	1.00	1.00	0.94	1.28	0.63	0.86	Pass
78	2480	1.00	1.00	0.95	1.30	0.64	0.87	Pass

Note: 本項測試的limit為至少為三分之二20dB頻寬。

**此測試圖僅放測試結果最差的頻道。



9.6 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

10 每一頻道停留時間之量測

10.1 適用標準

請見本報告3.1節第8項的規定。

10.2 量測方法

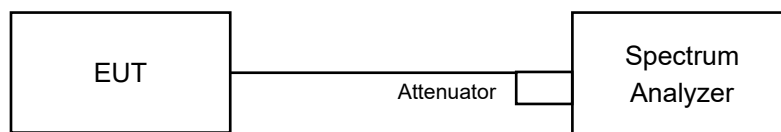
- 將待測物輸出接到頻譜分析儀上。
- 設定待測物處於正常傳輸跳頻模式下。
- 設定 RBW= 100kHz, VBW=300kHz，量測在不同傳輸模式下的頻道停留時間。

10.3 量測儀器

儀器名稱 (廠牌/製造商)	型號	序號	校正日期	下次校正日期
SPECTRUM ANALYZER R&S	FSV40	100980	Apr. 17, 2018	Apr. 16, 2019

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The measurement uncertainty is 207Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

10.4 測試配置

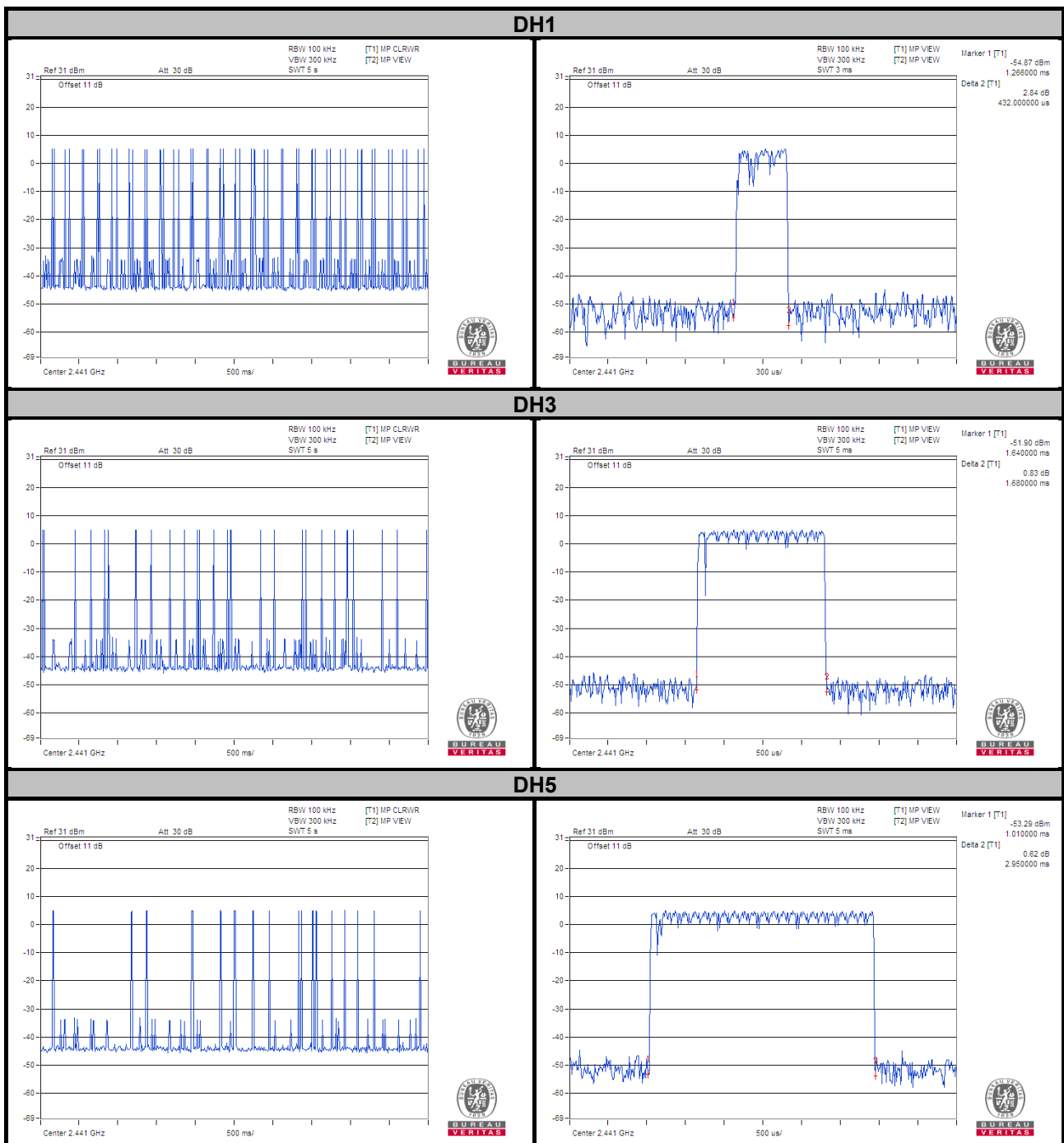


10.5 量測結果

GFSK

Mode	Number of Transmission in a 31.6 (79 Hopping*0.4)	Length of Transmission Time (msec)	Result (msec)	Limit (msec)
DH1	50 (times / 5 sec) * 6.32 = 316 times	0.432	136.51	400
DH3	26 (times / 5 sec) * 6.32 = 164.32 times	1.68	276.06	400
DH5	17 (times / 5 sec) * 6.32 = 107.44 times	2.95	316.95	400

註：因為 Bluetooth 每秒跳 1600 次，會平均落在每個頻道，所以僅測試 Ch39 作為代表。其掃描圖如下所示。



8DPSK

Mode	Number of Transmission in a 31.6 (79 Hopping*0.4)	Length of Transmission Time (msec)	Result (msec)	Limit (msec)
3DH1	50 (times / 5 sec) * 6.32 = 316 times	0.426	134.62	400
3DH3	26 (times / 5 sec) * 6.32 = 164.32 times	1.75	287.56	400
3DH5	16 (times / 5 sec) * 6.32 = 101.12 times	3.01	304.37	400

註：因為 Bluetooth 每秒跳 1600 次，會平均落在每個頻道，所以僅測試 Ch39 作為代表。其掃描圖如下所示。



10.6 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

11 檢測實驗室基本資料

立德國際商品試驗有限公司桃園分公司提供產業界最佳的檢測以及諮詢服務。
本公司為ISO/IEC 17025認可實驗室。

如您有任何問題或建議，請與下列實驗室聯絡：

林口 EMC / RF 實驗室：

Tel: 886-2-26052180

Fax: 886-2-26051924

新竹 EMC / RF 及通訊實驗室：

Tel: 886-3-6668565

Fax: 886-3-6668323

華亞 EMC / RF / Safety 實驗室：

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

您也可以在我们的網站內找到各實驗室的地圖。

---END---